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ONE HUNDRED SEVENTH CONGRESS

**U.S. House of Representatives**  
**Committee on Energy and Commerce**  
**Washington, DC 20515-6115**

W.J. "BILLY" TAUZIN, LOUISIANA,  
CHAIRMAN

January 10, 2002

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DAVID V. MARVENTANO, STAFF DIRECTOR

The Honorable David M. Walker  
Comptroller General  
U.S. General Accounting Office  
441 G Street, N.W.  
Washington, D.C. 20548

Dear Mr. Walker:

We request that the General Accounting Office (GAO) investigate the nature and adequacy of security policies and procedures at entities licensed by the Nuclear Regulatory Commission (NRC). This study should include an evaluation of security at civilian nuclear reactors (including research reactors), decommissioned reactors, spent nuclear fuel and other nuclear waste storage facilities, nuclear materials transportation security, uranium enrichment facilities and the effectiveness of the systems used to account for the whereabouts of nuclear materials.

Historically, there has been a reluctance on the part of the Nuclear Regulatory Commission and the nuclear industry to establish and maintain adequate security measures. In the aftermath of the events of September 11, concerns about shortcomings in existing security policies and procedures have been raised. In response to such concerns, the House of Representatives has recently adopted legislation which would mandate rulemakings by the NRC to upgrade security and also require other actions by the Executive Branch to address security concerns.

We also understand the NRC is reviewing security policies and procedures. But we are less than confident that the NRC will be sufficiently aggressive. First, the current security threat to nuclear facilities assumed by the NRC has been unrealistic, especially given the events of September 11. For example, the NRC regulations that set forth the "Design Basis Threat" (DBT) used to establish the threat against which its licensees are expected to protect does not consider more than "several" simultaneous attackers; it does not consider realistically sized truck bombs; it does not consider the possibility that more than one insider could be actively assisting the terrorists; and it does not consider the possibility that the attackers might have sophisticated knowledge of how the facility works.

Second, the NRC has even made repeated attempts to eliminate, or make ineffective by allowing the facility licensee to design and run, the force-on-force exercises (the program known as Operational Safeguards Response Evaluations, or OSRE) intended to assess whether the facilities can be defended against the DBT.

Third, the security requirements for spent nuclear fuel facilities are inadequate. While NRC's own analysis of an accidental zirconium fire at such a facility concluded that it could have "significant offsite radiological consequences," the analysis explicitly ignored the possibility that such a fire could be started by a terrorist. The NRC then inexplicably chose to reduce certain insurance, emergency preparedness and safeguards requirements at these facilities, which are not hardened to the same extent the reactor core is. Our understanding is that force-on-force OSRE exercises have never been conducted on spent fuel storage facilities either at operating or decommissioned reactors to assess whether these reduced security requirements are adequate.

Fourth, there has been a continued weakness in accounting for nuclear materials. For example, there have been at least two reports of spent nuclear fuel lost from the Millstone nuclear reactor in Connecticut and from the Dresden reactor in Illinois. In the Millstone case, the nuclear fuel has probably been missing for more than 20 years, but was only discovered to be missing last year. The Department of Energy Inspector General recently reported that nuclear materials were said to be located at NRC-licensed facilities that no longer existed, and that a significant quantity of Government-owned plutonium was held at a plant whose NRC license was terminated in 1993. This report also documented an instance in which the NRC retrieved a plutonium/beryllium source from an unsecured area of a high school that had not been licensed to hold the material for many years. There have also been persistent reports of theft and losses of an estimated two million radioactive sources used in a wide array of medical, research, commercial, and industrial applications around the United States, raising concerns about the nature and adequacy of existing controls over these materials.

A comprehensive review of the security of NRC licensed facilities, both past and present, is desperately needed. Consequently, we ask that GAO:

- 1) Review the NRC's public response and interim security measures taken in response to the events of September 11, including the nature and adequacy of any measures taken by the NRC or the industry to respond to the specific questions and concerns raised in the attached correspondence from Representative Markey, and provide GAO's recommendations for any further action by the NRC, its licensees, the Administration, or the Congress;
- 2) Evaluate the adequacy of the permanent security measures taken by the NRC in response to the events of September 11 to protect against the terrorist threat,

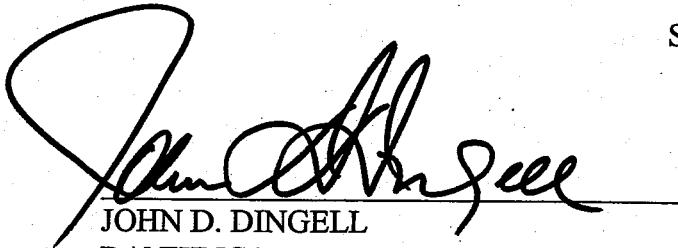
The Honorable David M. Walker  
Page 3

including any recommendations for further action by the NRC, its licensees, the Administration, or the Congress; and,

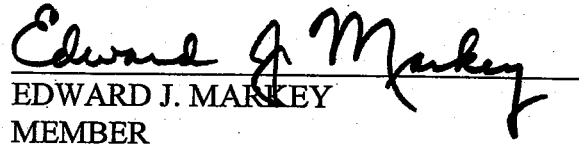
- 3) Evaluate (whether as part of this work or in a separate effort) the adequacy of the NRC's response since 1980: (a) to petitions or requests to upgrade security, and (b) to events warranting revisitation of assumed threats. This should include a review of the implementation of NRC's personnel security program which requires that NRC conduct background checks on new hires at nuclear facilities.

Thank you very much for your consideration of this important matter. If you have any questions or concerns, please contact us, or have your staff contact Ms. Edith Holleman and Mr. Rick Kessler of the Committee on Energy and Commerce Democratic staff at (202) 226-3400 or Dr. Michal Freedhoff and Mr. Jeffrey S. Duncan of Rep. Markey's staff at (202) 225-2836.

Sincerely,



JOHN D. DINGELL  
RANKING MEMBER



EDWARD J. MARKEY  
MEMBER

Attachment

cc: The Honorable W. J. "Billy" Tauzin, Chairman  
Committee on Energy and Commerce

EDWARD J. MARKEY  
7TH DISTRICT, MASSACHUSETTS  
www.house.gov/markey

ENERGY AND COMMERCE COMMITTEE  
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TELECOMMUNICATIONS AND  
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# Congress of the United States

House of Representatives

Washington, DC 20515-2107

September 20, 2001

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Dr. Richard A. Meserve  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Meserve,

In the wake of the terrible tragedies of September 11, I am writing once again regarding the security of our nation's nuclear power plants. In 1991, I wrote letters expressing concern about the security of nuclear power plants during the Gulf War. More recently, I have written several letters to the U.S. Nuclear Regulatory Commission (NRC) opposing its elimination of the counter-terrorism program known as Operational Safeguards Response Evaluations (OSRE). The events of the past week serve to highlight and heighten my long-standing concerns regarding security at nuclear power plants. There are several areas about which I am particularly concerned.

## 1. Assumptions made by the NRC in assessing the risk to nuclear power plants.

The OSRE program is focussed on repelling terrorists attacking on the ground, but it is clear that an attack from the air is also possible and must be considered. I am also concerned that previous probabilistic risk assessments for airplane crashes into nuclear power plants may have underestimated the risk since the assumption was that such crashes would be accidental. However, if the crash were deliberate, then such a risk assessment would be strikingly different.

Furthermore, NUREG-1628, "Staff Responses to Frequently Asked Questions Concerning Decommissioning of Nuclear Power Reactors",<sup>1</sup> includes the question: "What would happen to the fuel in the spent fuel pool if an earthquake ruptured the pool, or if an airplane crashed into the pool?" The answer given includes the statement: "In the unlikely event that an aircraft crashed into the spent fuel pool, the pool structure could be severely damaged and not capable of maintaining coolant level. ... However, the staff has evaluated the possibility of an aircraft impacting the spent fuel pool and consider it a very low probability event." As discussed above, the probability of an aircraft strike must now be reconsidered.

## 2. Assumptions made by the NRC about fires near spent fuel storage.

A number of references on the NRC website to the hazards of airplane crashes are in the context of damage to spent fuel stored in casks. In particular, some comments on three

<sup>1</sup> <http://www.nrc.gov/NRC/NUREGS/SR1628/sr1628.html>, sec. 5.8.5.

NRC rulings made in April and May of 2000 regarding additions to the list of approved spent fuel storage casks under 10 CFR Part 72.214 concerned the duration of fires that the casks should survive. Specifically, 50 to 200 gallons of conventional fuel are what is assumed to feed the fire, since that is all the on-site transporter vehicle is assumed to be carrying. The NRC cites 200 gallons as the approximate amount of fuel to supply a 15-minute fire.<sup>2</sup> Concerns about airplanes impacting the site and spilling a greater quantity of fuel were dismissed by the NRC with statements such as: "Other modes of transport causing the fire (e.g., airplanes, trains, delivery trucks or missiles) are not considered as plausible and are beyond the scope of this rule."<sup>3</sup> Considering that a Boeing 767 can carry over 20,000 gallons of fuel, simple math would suggest that an airplane crash could feed a day-long fire in the vicinity of the spent fuel casks. Clearly, the NRC must now consider different scenarios in its approach to safeguarding spent fuel from terrorist attacks.

### **3. NRC's assumptions regarding duration of fire at nuclear power plants.**

Fires could also pose a significant threat to control systems in the plant and hence the safety of the reactor. I have previously written to the NRC regarding passive fire barriers, and it is important to revisit that issue. In particular, the passive fire barriers in nuclear power plants are rated to withstand fires for either 1 hour or 3 hours, depending on whether the plant has automatic fire detection and suppression systems. I am concerned that an airplane fully loaded with jet fuel crashing into a nuclear power plant could support a fire that would last far in excess of these time scales as well as prevent the fire from being easily extinguished.

We must be vigilant and ensure that current programs to thwart terrorist activities at nuclear power plants are not compromised. And we must also evaluate other, previously unconsidered, modes of attack and develop appropriate measures to prepare for them. Therefore, I ask you to please fully respond to the following questions:

#### ***Security response by the NRC to events of September 11, 2001.***

- (1) According to a press release on the NRC website, on September 11 the NRC "recommended" that nuclear facilities go to the "highest level of security". Considering the apparently determined and synchronized nature of the attacks on September 11, why did the NRC choose to issue a "recommendation" instead of an "order"?
- (2) How many plants acted to implement the increase to the highest level of security that you recommended? Which plants? What steps did they take? How long do they plan to maintain the elevated level of security? Which plants did not choose to go to the highest level of security and why?

<sup>2</sup> <http://www.nrc.gov/NRC/CFR/FR/20000320/march20.html>, Response to Comment C.1.

<sup>3</sup> <http://www.nrc.gov/NRC/CFR/FR/20000501/may01.html>, Response to Comment C.10.

- (3) In light of last week's tragic events, is the NRC considering mandating changes in security at nuclear power plants? If not, why not? If yes, what will these changes be? Will these changes be permanent, or will they be in place for a limited period of time?
- (4) Press reports indicated that Canadian nuclear power plants increased security and that Russian nuclear power plant personnel received "additional instructions" to their already high state of security in the wake of the events on September 11. Did these measures and instructions constitute a greater or lesser increase in security than the measures recommended by the NRC for American nuclear power plants? What is the expected time duration of the Canadian and Russian measures?

***Defense of nuclear power plants against ground assaults by terrorists***

- (5) One lesson from the tragedies of September 11 is that the willingness of the terrorists to sacrifice themselves to accomplish their goals facilitated their ability to use commercial aircraft as weapons. Similarly, if a group of terrorists were to attack a nuclear power plant, their ability to cause a core meltdown could be enhanced if they were not interested in keeping themselves safe. As you know, the "design basis threats" are the hypothetical modes of radiological sabotage or theft of special nuclear material and are specified under 10 CFR 73.1. The design basis threat for a team of attacking terrorists describes them as "[w]ell-trained (including military training and skills) and dedicated individuals".<sup>4</sup> Now that we all fully appreciate the potential suicidal nature of the terrorists, would you seek to modify the design basis threat assumptions to include that characteristic?
- (6) The letters I have written to the NRC in the last few years have concerned the cancellation of the aforementioned OSRE program, either outright or in favor of an industry proposed program. In light of the events of last week, is the NRC going to reconsider plans to replace the OSRE program with a nuclear industry designed and managed program to test the adequacy of security measures at individual power plants? Instead of eliminating the OSRE program, will the NRC consider making OSRE tests more rigorous, with attacking teams more heavily armed than the specifications listed under 10 CFR 73.1?

***Damage due to intentional or accidental airplane crashes***

- (7) A quick search of the web turned up a guideline from the Swiss Federal Nuclear Safety Inspectorate (HSK), Guideline HSK-R-102, "Design Criteria for the Protection of Safety Equipment in Nuclear Power Stations against the Consequences of Airplane Crash."<sup>5</sup> Does the NRC have any design criteria for protection against airplane crashes? If not, why not? If so, does it apply only at

<sup>4</sup> Sec. 73.1(a)(1)(i)(A).

<sup>5</sup> [http://www.hsk.psi.ch/pub\\_eng/r-102e.html](http://www.hsk.psi.ch/pub_eng/r-102e.html)

plants located within a certain range from airports? If so, why was it not applied to plants all over the country? A recent press report mentioned in passing that nuclear power plant containment vessels are "designed to survive the crash of a falling 747".<sup>6</sup> Where can this specification be found?

- (8) A probabilistic risk assessment in the journal *Nuclear Safety*<sup>7</sup> of airplane impacts on nuclear power plants yielded a very small probability ( $4.6 \times 10^{-5}\%$ ) for the impact of a large airplane (greater than 12,500 lbs.) onto a plant that is more than 5 miles away from an airport. But this is assuming an *accidental* impact. In light of the events on September 11, it is clear that *deliberate* impacts must be considered. With a capable pilot committed to a terrorist attack on a nuclear power plant at the controls, the probability of impact is closer to 100%. What would be the result of a Boeing 767 with a full fuel tank making a direct impact onto a nuclear power plant at full speed? What would be the result of other aircraft, larger or smaller, impacting a nuclear power plant at full speed? Please fully assess the different circumstances of aircraft impacting the containment vessel as well as other reactor support facilities, and consider such factors as full or empty fuel tanks and large or small aircraft.
- (9) As discussed above, the NRC has previously dismissed as unlikely the prospect of aircraft hitting nuclear waste transportation containers or nuclear waste storage facilities. In light of last week's events, will the NRC revise its estimates of the likelihood of such attacks and require licensees to undertake further preparations for them?
- (10) As discussed above, the fuel from a Boeing 767 could feed a fire for long beyond the design requirements of spent fuel casks. What would happen to spent fuel storage casks if they were subjected to a fire for a full day? If the protective covering of the cask were burned away, what would happen to the fuel inside? Could we have a Chernobyl-style accident, where the fire carried radioactive materials into the air? Will there be a redesign of spent fuel casks? Why or why not?
- (11) The possibility of severe damage due to a fire at a nuclear power plant has been considered in the past. As discussed above, passive fire barriers in the plants are rated to withstand fires for 1 hour or 3 hours. Were these specifications made with the crash of a commercial airliner in mind? What changes will you make to the length of time that passive fire barriers need to resist a fire?

<sup>6</sup> Kenneth Chang, "Defending skyscrapers against terror," The New York Times, p. D1, September 18, 2001.

<sup>7</sup> Ian B. Wall, "Probabilistic Assessment of Aircraft Risk for Nuclear Power Plants," *Nuclear Safety*, Vol. 15, No. 3, pp. 276-284, 1974.

***Civilian protection from effects of a radioactive release at a nuclear power plant***

- (12) In the event of a release of radioactive materials from a nuclear power plant, it is crucial that distribution of potassium iodide (KI) be made to affected populations to prevent the uptake of radioactive iodine and the potential development of thyroid cancer and other thyroid disorders. What is the current status of NRC actions to make potassium iodide available to communities surrounding nuclear power plants, so that in the event of a successful terrorist attack against an accident at a U.S. nuclear facility, it could be quickly distributed to local populations? In light of last week's attacks, what is the NRC doing to expedite the distribution of sufficient stockpiles of potassium iodide?

***Foreign ownership of and employment at U.S. nuclear power plants***

- (13) In light of last week's events, will the NRC now reconsider its previous support for allowing foreign entities to acquire nuclear power plant operating licenses? Does the NRC foresee any increase in prospective security risks associated with having foreign entities own or control a nuclear facility? If not, why not?
- (14) In light of last week's events, what action, if any, has the NRC taken to evaluate the possibility of "insider threats" to nuclear power plants by members of any terrorist organizations? Who can work at such plants? What sort of background checks are performed as a condition of employment? Do employees have to be permanent residents or citizens of the U.S.?

***Export of nuclear technologies to foreign countries***

- (15) In light of last week's events, does the NRC believe that any new measures are needed to tighten up export controls relating to nuclear materials and nuclear technology, so that such materials and technology do not end up in terrorist hands? If not, why not, and if so, what new measures are necessary?

***Acts of terrorism now considered war?***

- (16) 10 CFR 50.13 provides that nuclear power plants do not need to be protected "against the effects of (a) attacks and destructive acts, including sabotage, directed against the facility by an enemy of the United States, whether a foreign government or other person...". Since the U.S. is preparing for a war on terrorism, I am concerned that the industry will insist that they do not need to provide defense against any terrorist attacks. Ray Golden, San Onofre business manager for Southern California Edison, recently stated, "We would characterize (the terrorist attacks) as President Bush did - an act of war."<sup>8</sup> He further stated, "We are not

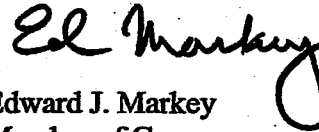
<sup>8</sup> Chris Knap, "San Onofre isn't jetliner-proof, either," *The Orange County Register*, September 18, 2001.



certain what could happen to the plant from that type of event, and we cannot protect completely against it. Nor, from a security standpoint, are we required to." In light of the attacks on September 11, do you believe that it is appropriate to change in any way the responsibilities of the NRC and the industry to take appropriate measures to protect the public from the consequences of acts of terrorism directed against nuclear power plants? Why or why not?

I appreciate your attention to these questions. Should you have any questions regarding these requests, please contact Jeff Duncan or Brendan Plapp of my office at 225-2836. I would appreciate a response by October 11, 2001.

Sincerely,

A handwritten signature in cursive script that reads "Ed Markey". The signature is written in dark ink and is positioned above the printed name and title.

Edward J. Markey  
Member of Congress



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

October 16, 2001

CHAIRMAN

The Honorable Edward J. Markey  
United States House of Representatives  
Washington, D.C. 20515-2107

Dear Congressman Markey:

On behalf of the Commission, I am responding to your letter of September 20, 2001, regarding the actions of the U.S. Nuclear Regulatory Commission (NRC) and the nuclear industry in response to the terrorist attacks on September 11, 2001, and your concerns regarding security at nuclear power plants. Although nuclear power plants are among the most hardened and secure civilian facilities in the United States, the recent attacks have focused attention on the need to review policies and practices related to safeguards and physical security measures for civilian nuclear facilities.

Immediately following the terrorist attacks on the World Trade Center and the Pentagon, the NRC advised nuclear power plant licensees to go to the highest level of security, and all promptly did so. With continued uncertainty about the possibility of additional terrorist activities, the Nation's nuclear power plants remain at the highest level of security and the NRC continues to monitor the situation. For the longer term, I, with the full support of the Commission, have directed the NRC staff to thoroughly reevaluate the NRC's safeguards and physical security programs. This reevaluation will be a top-to-bottom analysis involving all aspects of the Agency's safeguards and physical security programs.

Given the nature of the attacks on September 11, the identification of any necessary adjustments to the safeguards and physical security measures for civilian nuclear facilities must involve consultation and coordination with other U.S. national security organizations. The NRC is currently interacting with the Federal Bureau of Investigation, other intelligence and law enforcement agencies, and the Department of Defense to ensure any changes to the NRC's programs are informed by pertinent information from other relevant U.S. agencies.

Because the NRC's reevaluation is ongoing, the enclosed answers to your questions are founded on the information that is available at this time. The Commission appreciates your concern. If you have further comments or questions, please feel free to contact me.

Sincerely,

Richard A. Meserve

Enclosure: Responses to Questions

## RESPONSES TO QUESTIONS

**Question 1:**                    *Why did NRC choose to issue a "recommendation" [per Threat Advisory on September 11, 2001, and Information Notice 98-35] instead of an "order"?*

**Answer:**

All licensees have a continuing regulatory obligation to be able to defend against the Design Basis Threat. A Threat Advisory does not change this fundamental obligation, but merely provides a vehicle to advise licensees to be especially vigilant. Information Notice 98-35, "Threat Assessments and Consideration of Heightened Physical Protection Measures," issued on September 4, 1998, provides information to licensees as to how to respond to a NRC designation of a particular security level in a Threat Advisory. In essence, the Information Notice and a Threat Advisory provide a vehicle to facilitate communication between the NRC and its licensees when rapid actions are required. Forwarding the Threat Advisory on September 11, 2001, and referring to the Security Level 3 measures in the already-distributed Information Notice, allowed quick action on the part of the licensees to respond to the threat environment.

A Threat Advisory serves a different purpose than an order. Issuing an order, rather than a Threat Advisory, would have consumed time and resources and would have been no more effective in achieving the desired result. Nonetheless, the NRC retains the authority to issue orders requiring specific actions by all, or some, of its licensees. The staff has reviewed the actions taken by the licensees as a result of the Threat Advisory of September 11 and concluded that no additional actions were necessary at that time.

**Question 2:**                    *How many plants acted to implement the increase to the highest level of security that you recommended? Which plants? What steps did they take? How long do they plan to maintain the elevated level of security? Which plants did not choose to go to the highest level of security and why?*

**Answer:**

All relevant NRC licensees implemented a heightened security stance, as the NRC advised. The steps generally included increased patrols, augmented security forces and capabilities, additional security posts, heightened coordination with law enforcement and military authorities, and limited access of personnel and vehicles to the site, among other measures. On October 6, the NRC issued a safeguards advisory delineating certain prompt and longer-term additional actions to strengthen licensee capability to respond to a terrorist attack at or beyond the design basis threat. Licensees are currently implementing those actions.

All relevant licensees remain at an elevated security posture. The NRC is coordinating with the Federal Bureau of Investigation, other intelligence and law enforcement agencies, and the Department of Defense to continue to assess the threats and ensure that licensees maintain

the appropriate security level. The results of the ongoing assessments will inform NRC's decisions regarding adjustments in the recommended level of security.

**Question 3:** *Is the NRC considering mandating changes in security at nuclear power plants? If not, why not? If yes, what will these changes be? Will these changes be permanent, or will they be in place for a limited period of time?*

**Answer:**

In light of the attacks on September 11, and in response to a tasking memo from the Chairman to the Executive Director for Operations, the staff will undertake a comprehensive review of the NRC's existing regulations and proposed revisions and provide additional recommendations to the Commission. It is premature to predict what changes will be proposed.

**Question 4(a):** *Did the Canadian and Russian response to the events of September 11, 2001, [relative to their nuclear power plants] constitute a greater or lesser increase in security than the measures recommended by the NRC for American nuclear power plants?*

**Answer:**

The Commission believes that the baseline security level at U.S. commercial nuclear reactors is very high compared with most other nations. Indeed, many foreign regulators often comment on the impressive security measures and large guard forces evident when they visit our nuclear power plants. We are aware of no other regulator who systematically carries out security inspections involving force-on-force exercises. We understand the Canadian facilities instituted a number of measures in light of the September 11 attacks. Specific details concerning security at Canadian power reactor facilities constitute sensitive information.

The NRC has not exchanged information with the Russian government that would enable an assessment of the security at Russian nuclear power plants.

**Question 4(b):** *What is the expected time duration of the Canadian and Russian measures?*

**Answer:**

We do not know the duration of heightened security measures in Canada and Russia.

**Question 5:** *Would the NRC seek to modify the design-basis threat assumptions to include adversaries willing to commit suicide in their attack?*

**Answer:**

The NRC has routinely monitored the threat environment since the creation of the design basis threat (DBT) statements in the late 1970s. The willingness of terrorists, or others, to commit

suicide in the course of some criminal act, is an underlying assumption of the DBT and this is not considered to be a new adversary characteristic. The working assumption described in the DBT is that the adversary force is willing to kill or be killed in an attempt to complete its attack. However, the NRC will consider the information developed as a result of the September 11, 2001, event in determining potential adjustments to the DBT.

**Question 6(a):** *Is the NRC going to reconsider plans to replace the OSRE program with a nuclear industry-designed and managed program to test the adequacy of security measures at individual power plants?*

**Answer:**

The NRC has not made a decision to terminate the OSRE program. Before September 11, the Commission agreed to a pilot of the industry-designed Safeguards Performance Assessment (SPA) program. That pilot, which is subject to NRC oversight, would be evaluated after one year.

During the conduct of the SPA pilot, the NRC would continue OSRE inspections at a rate of six per year, which would be combined with eight NRC-evaluated SPA inspections. A final Commission decision regarding the method of conducting force-on-force testing would follow formal evaluation of lessons learned during the pilot program and the continuing OSRE program. As a result of the Chairman's tasking memorandum following the September 11 attacks, the entirety of the inspection program will be reexamined.

**Question 6(b):** *Instead of eliminating the OSRE program, will the NRC consider making OSRE tests more rigorous, with attacking teams more heavily armed than the specifications listed under 10 CFR 73.1?*

**Answer:**

As directed by the Chairman's tasking memorandum, both the Design Basis Threat and the inspection program will be reexamined.

**Question 7:** A quick search of the Web turned up a guideline from the Swiss Federal Nuclear Safety Inspectorate (HSK), Guideline HSK-R-102, "Design Criteria for the Protection of Safety Equipment in Nuclear Power Stations Against the Consequences of Airplane Crash." Does the NRC have any design criteria for protection against airplane crashes? If not, why not? If so, does it apply only at plants located within a certain range from airports? If so, why was it not applied to plants all over the country? A recent press report mentioned in passing that nuclear power plant containment vessels are "designed to survive the crash of a falling 747." Where can this specification be found?

Answer:

The Swiss guideline requires that "nuclear power stations shall be protected against the consequences of an airplane crash." The intent is to ensure that "the radiation exposure of the public shall not exceed the limits specified." We understand that the Swiss guideline reflects the heavy density of airline traffic over Switzerland.

The NRC has not routinely required all plants to be designed to withstand a particular aircraft crash, but such considerations have entered into siting evaluations. Those evaluations have considered the probability of accidental air crashes as a screening criterion to determine whether further evaluation is required. Specifically, 10 CFR 100.10, "Factors To Be Considered When Evaluating Sites," requires, in part, that "reactors will reflect through their design, construction, and operation an extremely low probability for accidents that could result in release of significant quantities of radioactive fission products." In addition, for applications after January 10, 1997, 10 CFR 100.20(b) requires that "the nature and proximity of man-related hazards (e.g., airports, dams, transportation routes, military and chemical facilities) must be evaluated to establish site parameters for use in determining whether a plant design can accommodate commonly occurring hazards, and whether the risk of other hazards is very low."

The NRC issued NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," Section 3.5.1.6, "Aircraft Hazards" (dated July 1981) that defines the Agency's acceptance criteria for siting nuclear power plants near airports and/or airways. The probability of an accidental aircraft crash resulting in radiological consequences greater than the exposure guidelines defined by 10 CFR Part 100 is considered to be acceptably low if the plant meets specified criteria regarding distance from airports, holding patterns, and approach patterns, as well as criteria regarding volumes of air traffic. If the plant does not meet these criteria, a detailed review of accidental aircraft hazards must be performed. If that detailed hazard review cannot demonstrate an acceptably low probability of an aircraft accident resulting in radiological consequences greater than the exposure guidelines defined by 10 CFR Part 100, engineering analyses of aircraft impacts are required. The probability is considered to be acceptably low if the probability, based on a realistic assessment, is less than about  $10^{-7}$  per year (or  $10^{-6}$  per year given a conservative assessment).

If the plant cannot meet the probability criteria; the plant's structures, systems, and components must be designed to withstand the effects of the postulated aircraft impacts and fires without loss of safe shutdown capability, and without a release of radioactivity that would exceed the exposure guidelines defined by 10 CFR Part 100.

The NRC has no criterion that requires nuclear power plant containment vessels to be designed to survive the crash of a falling Boeing 747.

Question 8:

*A probabilistic risk assessment in the journal Nuclear Safety of airplane impacts on nuclear power plants yielded a very small probability ( $4.6 \times 10^{-5}$  %) for the impact of a large airplane (greater than 12,500 lbs) onto a plant that is more than 5 miles away from an airport. But this is assuming an accidental impact. In light of the events on September 11, it is clear that deliberate impacts must be considered. With a capable pilot*

*committed to a terrorist attack on a nuclear power plant at the controls, the probability of impact is 100%. What would be the result of a Boeing 767 with a full tank making a direct impact onto a nuclear power plant at full speed? What would be the result of other aircraft, larger or smaller, impacting a nuclear power plant at full speed? Please fully assess the different circumstances of aircraft impacting the containment vessel as well as other reactor support facilities, and consider such factors as full or empty fuel tanks and large or small aircraft.*

Answer:

Nuclear power plants have an inherent capability to protect public health and safety through such features as robust containment buildings, redundant safety systems, highly trained operators. These plants are among the most hardened structures in the country and are designed to withstand extreme events, such as hurricanes, tornadoes, and earthquakes. In addition, all NRC licensees with significant radiological material have emergency response plans to mitigate impacts on the public in the event of a release. However, the NRC did not specifically consider attacks by aircraft such as Boeing 757s or 767s, and nuclear power plants were not specifically designed to withstand such crashes. The NRC has not yet performed detailed engineering analyses of a large airliner crash; and thus cannot, at this point, provide an assessment of the likely consequences of such an attack.

The NRC staff is evaluating strategies to assess the effects of a deliberate aircraft impact and the resulting fire and explosion on the reactor containment building and other reactor support facilities. Variables considered in the analyses will include aircraft size and speed, as well as the amount of fuel.

Question 9:

*Will the NRC revise its estimates of the likelihood of attacks by aircraft hitting nuclear waste transportation containers or nuclear waste storage facilities, and require licensees to undertake further preparations for such attacks?*

Answer:

As discussed in response to Question 7, above, the previous NRC estimates were based on an accidental airplane crash, not an intentional crash. In response to the terrorist attack of September 11, 2001, the NRC has begun a thorough review of the safeguards and physical security programs. This effort will include input from the national security organizations, the FBI, intelligence and law enforcement agencies, the Department of Defense and others to evaluate the level of threat to which civilian nuclear facilities must be able to respond. It will also consider the results of discussions with these agencies on how to deal with threats beyond the design basis, such as enemy-of-the-state threats.

Question 10(a):      *What would happen to spent fuel storage casks if they were subjected to a fire for a full day?*

Answer:

The capacity of spent fuel dry storage casks to withstand a fire for extended time, such as 24 hours, has not been analyzed, given the very low probability that firefighting personnel would be unable to respond within 24 hours. However, previous studies have analyzed worst case impact conditions for aircraft accidents, and these studies have found that most of the aircraft fuel would be dispersed and will burn off in a matter of minutes. Thus, if impacted by a large commercial aircraft, a spent fuel storage cask would not be expected to be appreciably affected by a fire. However, if, as a result of the NRC's review of the terrorist events of September 11, 2001, the NRC determines that additional or revised safety or physical protection actions or requirements need to be taken at independent spent fuel storage installations, the NRC will take appropriate actions to implement those measures.

Question 10(b):      *If the protective covering of the cask were burned away, what would happen to the fuel inside?*

Answer:

The concrete and/or steel protective coverings are not readily flammable and will not be burned away. Therefore, the staff believes that a fire will not result in failure of the inner canister. As indicated above, if, as a result of the NRC's review of the terrorist events of September 11, 2001, the NRC determines that additional or revised safety or physical protection actions or requirements need to be taken at independent spent fuel storage installations, the NRC will take appropriate actions to implement those measures.

Question 10(c):      *Could we have a Chernobyl-style accident, where the fire carried radioactive materials into the air [from a spent fuel storage cask]?*

Answer:

No. Even if a spent fuel storage cask were impacted and penetrated by a commercial aircraft, the resultant effects could never be equivalent to a Chernobyl-type accident because the amount of radioactive material contained within the cask is orders of magnitude less than in an operating reactor, and the mechanisms for dispersal of the material are fewer than were present during the Chernobyl accident. In the event of a crash of a large commercial aircraft, and if the cask were breached, we could not exclude the possibility of localized impacts.

Question 10(d)      *Will there be a redesign of spent fuel casks? Why or why not?*

Answer:

As previously stated, if, as a result of the NRC's review of the terrorist events of September 11, 2001, the NRC determines that additional or revised safety or physical protection actions need to be taken or new requirements implemented at independent spent fuel storage installations,



including the design requirements for spent fuel casks, the NRC will take appropriate actions to implement those measures.

Question 11:

*The possibility of severe damage due to a fire at a nuclear power plant has been considered in the past. As discussed above, passive barriers in the plants are rated to withstand fires for 1 or 3 hours. Were the specifications made with the crash of a commercial airliner in mind? What changes will you make to the length of time that passive fire barriers need to resist a fire?*

Answer:

The objective of the NRC's current fire protection requirements is to ensure that a single internal fire event does not adversely affect the ability of the plant to achieve and maintain safe shutdown. Fire barriers are only one of the many elements of the defense-in-depth principle that is applied to nuclear power plant fire protection; therefore, licensees do not solely rely on installed fire barriers to achieve and maintain safe shutdown. The specifications for the qualifications of fire barriers installed in nuclear power plants to meet the NRC's objective are founded on the testing protocol described by the American Society of Testing Materials, Standard Test Methods for Fire Tests of Building Construction and Materials (ASTM E-119). This standard is used to measure and describe the properties of fire barrier materials under controlled laboratory conditions. This standard is widely used as the basis for rating the fire barriers that are used in many types of industrial facilities besides nuclear power plants. Increasing the length of time required for passive barriers installed at a nuclear power plant to resist a laboratory fire would not ensure that the fire barriers would be able to protect important safety systems, because the scenario in which a commercial airliner impacts and penetrates a structure would likely also damage the fire barriers as a result of the impact of debris from the aircraft or the damaged structure. Therefore, changes to the length of time that passive barriers need to resist a fire would not, by themselves, be an effective means of addressing the aircraft crash threat.

Question 12:

*What is the current status of NRC actions to make potassium iodide available to communities surrounding nuclear power plants, so that in the event of a successful terrorist attack against a U.S. nuclear facility, it could be quickly distributed to local populations? What is the NRC doing to expedite the distribution of sufficient stockpiles of potassium iodide?*

Answer:

In January 2001, the NRC revised a portion of its emergency response regulations to require that consideration be given to including potassium iodide (KI) as a protective measure for the general public to supplement sheltering and evacuation in the event of a severe nuclear power plant accident. In doing so, the Commission found that KI is a reasonable, prudent, and inexpensive supplement to evacuation and sheltering for specific local conditions. The Commission left it to the States to make a final decision on the use of KI as a supplemental measure. But the Commission decided to fund the initial purchases of KI for any State making

a decision to stockpile KI. NRC set aside \$400,000 in FY 2001 and has requested similar funding in FY 2002 to purchase KI.

Together with the Federal Emergency Management Agency (FEMA), the NRC has formed a subcommittee to develop and implement a program to distribute potassium iodide (KI) to States which decide to include KI in their range of public protective actions. The use of KI would supplement other protective measures, such as evacuation and sheltering. The NRC/FEMA KI subcommittee has been meeting approximately monthly since January 2001 to develop procedures, processes, and guidance for KI program implementation. Presently, the subcommittee is awaiting the issuance of final Food and Drug Administration (FDA) guidance on dosage and intervention levels, which are needed to complete the NRC KI distribution program. FDA published its draft guidance in January 2001.

The NRC formally requested that a Federal Radiological Protection Coordinating Committee (FRPCC) subcommittee on KI be formed with representatives from the FDA and the Environmental Protection Agency (EPA), as well as the NRC and FEMA. The purpose of the FRPCC KI subcommittee is to expedite review and revision of the Federal KI policy, encourage the finalization of FDA guidance, and coordinate KI implementation issues. That subcommittee had its initial meeting on September 25, 2001. Additionally, as the NRC requested through the FRPCC, FEMA Director Allbaugh sent a letter to the U.S. Department of Health and Human Services (HHS) Secretary Thompson requesting expedited review of the FDA guidance on the use of KI.

The FRPCC KI subcommittee is being used as a forum to discuss and develop recommendations for consideration by the member agencies regarding the impact of the September 11 events on the Federal KI policy, and KI stockpiling and distribution issues. At present, the NRC intends to proceed with implementing its KI distribution program for States that decide to include KI in their range of public protective actions once the FDA guidance is finalized.

**Question 13:**

*In light of last week's events, will the NRC now reconsider its previous support for allowing foreign entities to acquire nuclear power plant operating licenses? Does the NRC foresee any increase in prospective security risks associated with having foreign entities own or control a nuclear facility? If not, why not?*

**Answer:**

The reasons that the NRC has given Congress for removing the statutory ban on foreign ownership of nuclear power operating licenses remain sound in our view. The current ban in Sections 103d and 104d of the Atomic Energy Act of 1954 (AEA) is unqualified. It applies to all foreign entities, making no distinction between friend, such as the United Kingdom, and foe, such as Iraq. Moreover, the ban fails to accomplish its primary goal of preventing transfer of nuclear power technology because, unlike in 1946 when the statutory ban went into effect, nuclear power technology is well known abroad. In the absence of the ban, there would still be ample protection against an inappropriate licensee because the Commission would still be prohibited from issuing any operating license to a foreign entity if the foreign ownership would

be inimical to the common defense and security or the health and safety of the public. Before making such a determination, the Commission would be able to obtain the views of the Executive Branch.

**Question 14(a):** *What action, if any, has the NRC taken to evaluate the possibility of "insider threats" to nuclear power plants by members of any terrorist organizations?*

**Answer:**

Since September 11, 2001, the FBI has provided to the NRC frequently updated lists of individuals who may have ties or information related to terrorist activities. At the request of the FBI, the NRC provided these lists to the nuclear power plants, the nonpower reactor facilities, decommissioning plants, and selected fuel facilities to be checked against utility employment and visitor records. The Nuclear Energy Institute has also been provided the lists to be checked against a database of temporary nuclear utility workers. All results are being provided by NRC to the FBI for resolution. To date, all potential matches have been resolved through the FBI.

**Question 14(b):** *Who can work at nuclear power plants?*

**Answer:**

In order to be authorized for unescorted access at a nuclear power plant, an individual must undergo a background screening and investigation pursuant to 10 CFR 73.56, and such workers are subject to ongoing fitness-for-duty requirements. The screening criteria include: (1) a background investigation designed to identify past actions which are indicative of an individual's future reliability within a protected or vital area of a nuclear power reactor; (2) a psychological assessment designed to evaluate the possible impact of any noted psychological characteristics which may have a bearing on trustworthiness and reliability; and (3) behavioral observations, conducted by supervisors and management personnel, designed to detect individual behavioral changes which, if left unattended, could lead to acts detrimental to the public health and safety.

**Question 14(c):** *What sort of background checks are performed as a condition of employment?*

**Answer:**

As noted above, there are requirements for background screening and investigation before authorizing an individual to have unescorted access to the site. In accordance with 10 CFR 73.56, the background investigation includes employment history, education history, criminal history, military service, and credit history, as well as a psychological evaluation, interview of developed references, and fitness-for-duty testing. With and without authorization for unescorted access, all individuals working inside the licensee's protected area are subject to continued behavioral observation, as required by 10 CFR 73.56, to identify aberrant behavior or other indications that the individual is, or has become, untrustworthy.

**Question 14(d):** *Do employees [at nuclear power plants] have to be permanent residents or citizens of the U.S.?*

**Answer:**

Employees at nuclear power plants do not have to be permanent residents or citizens of the United States.

**Question 15:** *Does the NRC believe that any new measures are needed to tighten up export controls relating to nuclear materials and nuclear technology, so that such materials and technology do not end up in terrorist hands? If not, why not, and if so, what new measures are necessary?*

**Answer:**

The NRC's export licensing regulations, including the related decision criteria, are founded on explicit provisions of the Atomic Energy Act of 1954, as amended by the Nuclear Non-Proliferation Act of 1978, the Energy Policy Act of 1992, and other acts. These provisions place strict controls on U.S. exports of nuclear materials and other materials and equipment of significance for nuclear explosive purposes. To date, the NRC's licensing specialists have not identified any of these provisions that should be changed in light of increased concerns about terrorist attacks.

From a broader perspective, the NRC's export regulations are only one of several facets of U.S. and multilateral export controls. The Agency anticipates and is prepared to participate in, interagency reviews involving Executive Branch agencies (such as the Departments of State, Energy, Commerce, Defense, and Transportation) to address those controls that bear on terrorist intentions and acts. The Agency will also support U.S. Government efforts in the Nuclear Suppliers Group and the International Atomic Energy Agency.

**Question 16:** *10 CFR 50.13 provides that nuclear power plants do not need to be protected "against the effects of (a) attacks and destructive acts, including sabotage, directed against the facility by an enemy of the United States, whether a foreign government or other person..." Since the U.S. is preparing for a war on terrorism, I am concerned that the industry will insist that they do not need to provide defense against any terrorist attacks. Ray Golden, San Onofre business manager for Southern California Edison, recently stated, "We would characterize (the terrorist attacks) as President Bush did." He further states, "We are not certain what could happen to the plant from that type of event, and we cannot protect completely against it. Nor, from a security standpoint, are we required to." In light of the attacks on September 11, do you believe that it is appropriate to change in any way the responsibilities of the NRC and the industry to take appropriate measures to protect the public from the consequences of acts of terrorism directed against nuclear power plants? Why or why not?*

Answer:

The NRC cannot determine at this time what changes may be appropriate regarding the responsibilities of the industry to protect against acts of terrorism and the responsibilities of our homeland security agencies. The NRC has started a full review of its security standards, and that review may bring to light some need to change the division of responsibilities between the government and the private sector. Moreover, our interactions with the newly established Office of Homeland Security and other agencies should help to further clarify where the lines between the industry's responsibilities and the national government's should be drawn.

At present, consistent with 10 CFR 50.13, licensees are not required to protect against offensive military actions by foreign governments (such as aircraft attacks). Such actions have ramifications for the Nation's security (not only the security of an individual facility) and, as a practical matter, may be beyond the defensive capability of private organizations. Protection against these types of attacks may be more appropriately the responsibility of the national defense establishment. On the other hand, 10 CFR 73.1(a)(1) requires that licensees must protect against violent actions by well-trained and well-equipped persons, even those who are supported by a foreign government, if these activities (for example, vehicle bombings) could also be carried out domestically.

EDWARD J. MARKEY  
7TH DISTRICT, MASSACHUSETTS  
[www.house.gov/markey](http://www.house.gov/markey)

ENERGY AND COMMERCE COMMITTEE  
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October 15, 2001

The Honorable Richard A. Meserve  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Chairman:

I am writing you regarding the decision to close down Commission's web site (<http://www.nrc.gov/>). As you know, anyone who currently attempts to access this site received the following notice:

"Our site is not operational at this time. In the aftermath of the terrorist attacks of September 11, the Nuclear Regulatory Commission has taken the action to shut down its web site. In support of our mission to protect public health and safety, we are performing a review of all material on our site. We appreciate your patience and understanding during these difficult times."

It is my understanding that the NRC's web site has been down since last Thursday. The NRC staff has informed my staff that the site was shut down following a request from a military officer who alleged that there was classified information on the site. The NRC staff further indicated that they did not know when the site will be up and running again. Please inform me of the facts and circumstances surrounding this matter. In your response, please indicate whether the NRC has been allowing classified information or confidential safeguards information to be improperly released through its web site where any potential terrorist could obtain access to such data. If so, please explain how this could have happened and how long the sensitive or classified information has been posted on the NRC web site. If no classified information or safeguard information has been improperly posted, please explain why the NRC web site has been shut down.

In addition, I am interested in knowing exactly what information the Commission decides to remove from the website during its review. I therefore request that I be provided with a comprehensive list of all materials that are removed, (or which have been removed since September 11, 2001) and an explanation of the basis for the decision to remove this material from the NRC's web site. If the Commission determines that it needs to provide such information to me in a non-public form, please contact me to arrange appropriate safeguards.

Finally, I would urge that as the Commission reviews the information on its web site, it should make every effort not to remove any information that is not properly classified or which is not properly considered sensitive safeguards-related information. Despite the difficult times we are living through, it is important to our democracy for the public and the Congress to be able

The Honorable Richard A. Meserve  
October 15, 2001  
Page 2

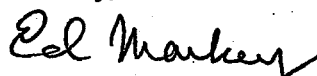
to get access to information about how the Commission carries out its important mission of regulating the safety and security of our nation's civilian nuclear facilities. The Commission's web site has been an invaluable aid to the public, the press and the Congress in this regard.

I would also note that at least some of the information that has been disseminated over the NRC's web site may also be important to the functioning of our nation's electricity markets. A Reuters story (see attachment) reports that wholesale electricity prices could be pushed upwards due to the loss of access to the NRC's daily plant status report. Uncertainty in the marketplace regarding which plants are operating raises uncertainties that could raise prices. The article also reports that keeping this information from the marketplace would give reactor owners and the local utilities they supply a big advantage over energy marketers who have no power plants in the area. At the same time, the article quotes one trader as stating, "If they find some this information would be dangerous in the hands of a terrorist, then I'm all for keeping it off the Web site." I entirely agree, and would suggest that a risk assessment of the costs and benefits of disseminating such market information is needed.

I therefore request that you inform me whether the NRC is planning to permanently remove this type of market data from its web site. If so, I request that the Commission provide its assessment of the impact of such an action on the nation's wholesale electricity marketplace and the competitive impacts of removing this type of data from the NRC web site. I also request that the Commission report on whether there may be any alternative sources where market participants could obtain the same or similar data, such as the web sites of various regional transmission organizations. In addition, please provide me with the Commission's views on whether the national security necessitates removing this data from the website notwithstanding any adverse economic or marketplace impacts. If national security requirements do not necessitate removal of this data, I would urge that it be restored as soon as possible.

Thank you for your assistance and cooperation. I request that the Commission provide a response to the questions set forth in this letter within 15 working days, or no later than close of business, November 5, 2001. Should you have any questions about this request, please contact Mr. Jeffrey S. Duncan or Dr. Michal Freedhoff of my staff at 202-225-2836.

Sincerely,



Edward J. Markey  
Ranking Democratic Member  
Subcommittee on Telecommunications  
And the Internet

Attachment

● COLLAPSE STORY

● PREV STORY

REUTERS ●

## Blocked nuclear data seen lifting U.S. power prices

15:47:51, 12 October 2001

NEW YORK (Reuters) - A federal agency's decision to stop posting potentially sensitive nuclear power plant data on its Web site following the Sept. 11 attacks could push up wholesale electricity prices, traders said Friday.

The Nuclear Regulatory Commission (NRC), which oversees the use of all radioactive materials in the country, suspended its Web site Thursday, as part of a general tightening of security nationwide.

"Our site is not operational at this time. The Nuclear Regulatory Commission has taken the action to shut down its web site," the NRC said in a statement posted on the site (<http://www.nrc.gov>).

"In support of our mission to protect public health and safety, we are performing a review of all material on our site. We appreciate your patience and understanding during these difficult times."

Among information previously shown on the Web site was the plants' locations, including longitude and latitude, and general design specifications for each facility.

Several electricity traders, who look daily to the federal agency's plant status report for fundamental market supply data, told Reuters not knowing whether a plant was operating raised uncertainties that would be reflected in higher prices.

"It's amazing how Sept. 11 has affected things you would never expect," one Houston-based trader said.

The daily plant status report lists the operating status of each of the 103 U.S. nuclear reactors, which provide about 20 percent of the country's electricity.

"If they find some reason this information would be dangerous in the hands of a terrorist, then I'm all for keeping it off the Web site," the trader said, echoing the views of all the power traders Reuters surveyed.

They warned, however, that keeping the information from the marketplace would give reactor owners and the local utilities they supply a big advantage over energy marketers who have no power plants in the area.

Nuclear reactors are among the lowest cost sources of electricity in the United States.

When a nuclear plant shuts, the region's grid operator tells generating companies to fire up more



expensive oil- and gas- fired plants to cover the shortfall.

"You take in all the information available, process it and make a best guess at what the price of power will be each day based on what plants are available, what the weather is, what the cost of fuel is. Not knowing where the nukes are is just another unknown that will cost money," one trader said.

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● STORY TOP





UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

November 13, 2001

The Honorable Edward J. Markey  
United States House of Representatives  
Washington, D.C. 20515-2107

Dear Congressman Markey:

The Commission has received your letter dated October 15, 2001, expressing concern regarding the temporary shutdown of the NRC website for the purpose of performing a review of the material posted on it. Our action in initiating a review of our website is one undertaken by many government agencies as part of an ongoing effort to thwart any potential information-gathering activities by terrorists. The operation of the NRC website was restored within approximately one week--on October 18. It currently makes available many, but not all, categories of documents that were formerly available.

As of this writing, the website includes information on the NRC's mission and governing legislation, how to contact NRC, public meeting notices, Agreement State Programs, the agency telephone directory, news releases, NRC regulations published in 10 CFR, current rulemakings, access to the agency document management system (ADAMS) containing more than 125,000 publicly available documents, information about NRC's Public Document Room, FOIA information, contracting opportunities, opportunities for employment, information on how to report a safety concern, the Inspector General's hotline, and materials on the Regulatory Information Conference.

Our review of the remaining materials is proceeding in a deliberate and systematic manner. We will continue to restore material to the website that is deemed appropriate.

We agree with you that no classified or sensitive safeguards information belongs on the website at any time. To our knowledge none has been found in the current review and we do not expect to find any. Nonetheless, the objective of the shutdown of the site and the ongoing review is to avoid facilitating the information-gathering processes of those seeking to harm the United States of America, while simultaneously providing for meaningful public participation in the NRC regulatory process.

Your letter raises the issue of whether the NRC intends to remove plant status reports from the website permanently. The Commission is currently reviewing this issue and is consulting with other agencies of the Federal government. I will keep you informed of the Commission's final decision.

Sincerely,

Richard A. Meserve

EDWARD J. MARKEY

7TH DISTRICT, MASSACHUSETTS

[www.house.gov/markey](http://www.house.gov/markey)

ENERGY AND COMMERCE COMMITTEE

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November 15, 2001

The Honorable Richard A. Meserve  
Chairman  
Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Chairman:

Thank you for your letter of October 16, 2001, responding to my letter of September 20, 2001 regarding the terrorist threat to nuclear facilities. I am writing to follow-up on several issues raised by your response, and to seek additional information and clarifications regarding the nature and adequacy of actions undertaken by the Commission and the industry to upgrade security at nuclear plants.

As you know, on October 31, 2001, the House Energy and Commerce Committee approved an amendment that I, along with Chairman Tauzin and Ranking Democratic Member Dingell offered to H.R. 2983, the Price-Anderson Reauthorization Act. This amendment would require the President to undertake an immediate assessment of what aspects of the defense of nuclear facilities should be the responsibility of the federal government, and what aspects should be the responsibility of the Commission and its licensees. The amendment requires the Commission to undertake a mandatory rulemaking to upgrade its rules relating to the design basis threat, to issue new rules to strengthen the security of radioactive materials transportation, and codifies into the Atomic Energy Act of 1954 a requirement for an Operation Safeguards Response Evaluation (OSRE) program. I urge the Commission to review this amendment carefully and drop its opposition to immediate enactment of legislation requiring an NRC rulemaking on the DBT and transportation security, such as that articulated in your October 5, 2001 letter to Chairman Tauzin.

As the Congress proceeds to take up this legislation, there are a number of questions raised by your most recent letter that I would like to have answered in order to better understand the nature and adequacy of the Commission's and licensee's responses to the current terrorist threat and the impact of the pending amendment on those activities. I therefore would appreciate your assistance and cooperation in providing responses to the following questions:

**Questions on the NRC's Immediate Response to the Events of September 11**

- 1) Please provide me with copies of the Threat Advisory issued to licensees on September 11, 2001 and the Safeguards Advisory issued to licensees on October 6, 2001. Please also provide me with copies of any Confirmatory Action Letters sent to licensees. Should any of these documents be nonpublic, please advise your staff to make appropriate arrangements with my staff for transmittal and safekeeping of these documents.
- 2) In your October 16th letter, you advised me that the Commission had decided to issue a Threat Advisory on September 11th rather than an order because issuing an order "would have consumed time and resources and would have been no more effective in achieving the desired result."
  - a) Please explain why issuance of an order would have been more time and resource consuming.
  - b) Does the Commission believe that any changes in its procedures for issuing orders may be needed in order to assure that such orders can be issued rapidly to respond to emergency situations?
  - c) From a legal and enforcement standpoint, what is the difference between a Threat Advisory and an Order? In your response, please address the consequences of noncompliance by a licensee. Can licensees be fined or otherwise penalized if they fail to implement the heightened security measures asked for in an advisory? If not, wouldn't issuance of an order be more appropriate, in order to signal to licensees that full compliance is expected?
- 3) On September 28, 2001, you sent a memo to the NRC's Executive Director for Operations directing the NRC staff to undertake a comprehensive reassessment of the Commission's security requirements. Please report on what specific actions have been proposed or undertaken in response to that request.
- 4) In your October 16<sup>th</sup> letter, you indicated that "all relevant licensees" have implemented a heightened security posture and that "all relevant licensees" remain at an elevated security posture. Please inform me what the Commission means by "relevant licensees." Does this term include all production and utilization facilities, including research reactors and decommissioned reactors and all materials licensees, or are some excluded? If so, please explain the rationale underlying the Commission's decision to include certain licensees, but not others.
- 5) In your October 16, 2001 letter, you indicated that "The NRC has routinely monitored the threat environment since the creation of the design basis threat (DBT) statements in the late 1970s." How many times has the DBT been changed since the first DBT rule was enacted? What specific changes were made in the DBT on each of these occasions, and how did these changes differ in the final rule from those originally put forward in the proposed rule?

- 6) I have received your November 13, 2001 letter regarding the temporary shutdown of the NRC website, and appreciate your updating me regarding the current status of efforts to review materials that had been posted on the site, as well as your consideration of the concerns raised in that letter. As I indicated in my letter of October 15<sup>th</sup>, I would like a list of all materials removed from the web site since September 11, 2001 and an explanation of the basis for the removal of such materials. Please provide such a list as soon as the NRC staff completes its review of the Web Site.
- 7) On September 12, 2001, in a document entitled "NRC Staff Responses to Contentions Submitted by Donald Moniak et al" in NRC docket number 070-03909, the Duke Cogema Stone & Webster MOX Fuel Fabrication Facility Construction Authorization Request, NRC stated that "GANE [petitioners] provides no support for its general assertion that 'malevolent acts must be analyzed as a foreseeable environmental impact under NEPA . . . and GANE does not establish that terrorist acts (involving the proposed MOX Facility or related materials) fall within the realm of 'reasonably foreseeable' events." Does the NRC intend to amend this filing, in light of the events of September 11? If not, why not?

**Questions on Background Checks Required by Employees of Nuclear Facilities**

- 1) Your October 16 letter stated that the background checks required for personnel at nuclear facilities is limited to a check of criminal history, psychological history, training/education, and other behavioral observations. However, you apparently do not require that the background of the individual be checked to ensure that he or she is not a member of a domestic or foreign group that seeks to do harm to the U.S. Do you plan to require this sort of security background check of all current and future employees, in light of the events of September 11? If not, why not, given the possibility that Al Queda or other groups could seek to place one of their U.S.-based members at a job inside a nuclear reactor to assist as an insider in a future terrorist attack on the facility?
- 2) Your letter also indicates that since September 11<sup>th</sup>, the FBI has provided the NRC with frequently updated lists of individuals who may have ties or information related to terrorist activities and that, to date, all potential matches had been resolved through the FBI. Were there any positive matches? How many and at what plants? What action was taken?
- 3) Your letter also indicated that "employees at nuclear power plants do not have to be permanent residents or citizens of the United States." How many of those currently employed at the plants are foreign nationals? What countries are they from? How does the NRC assure that such individuals are properly screened to assure that they do not pose a risk to the security of the facilities due to any associations with any terrorist organizations?

### **Questions on the Adequacy of Security Forces at Nuclear Facilities**

- 1) It has been suggested to me that over the last decade, some NRC licensees have significantly reduced their expenditures on security, as well as the number of security personnel at their facilities, resulting in a weakening of security at these facilities. Please provide me with a table listing the total annual security expenditures for each commercial nuclear power plant regulated by the Commission for each of the last 10 years, and the total number of armed security employees employed at such facility during each of the last ten years with responsibilities to respond to attacks. In this table, also provide a column indicating the percentage increase or decrease in security expenditures and numbers of security personnel at each facility during this ten-year period.
- 2) Is there any variation in the numbers of armed security employees deployed at each plant during periods of "heightened alert," such as those that have followed the events of September 11th? If not, why not, since presumably a period of heightened alert would necessitate an increased number of armed responders?
- 3) Does the Commission believe the numbers of persons employed by licensees to protect the plants is adequate in light of the number of terrorists involved in the September 11<sup>th</sup> attacks, and the potential for similar numbers of terrorists to be involved in a future attack against a nuclear power plant?
- 4) Which plant or plants currently deploys the most armed responders? Which plant or plants currently deploys the fewest armed responders? What security rationale justifies these differences, if any?

### **Questions on Force-on-Force Operational Safeguards Response Evaluations at Nuclear Facilities**

As you know, the Operational Safeguards Readiness Evaluation (OSRE) program began testing nuclear plant security in 1991 with force-on-force exercises. Since that time, the NRC has conducted OSREs at approximately eight plant sites annually. In FY02, the NRC reduced the number of OSREs scheduled down to six, reportedly to free up resources to evaluate the pilot of the industry's Safeguards Performance Assessment (SPA) program. The OSREs provided the NRC with invaluable insights into actual security performance, identifying vulnerabilities and protective strategy faults that could not be otherwise identified. More importantly, OSREs identified problems that might not otherwise have been identified and corrected. However, during a public meeting at the NRC on October 10, 2001, NRC employee Alan Madison stated that the next OSRE had been cancelled and future OSREs deferred.

- 1) Why did NRC choose to cancel the next OSRE and defer future OSREs? Don't you believe that the events of September 11th demonstrate the need for ADDITIONAL strengthened OSREs? Doesn't the cancellation of the OSREs mean that security problems are no longer being identified and fixed, leading to an overall reduction in security at nuclear facilities?
- 2) On September 11, 2001 the NRC placed nuclear facilities on their highest level of security preparedness. Have any of the dozens of OSREs conducted since 1991 been conducted with the nuclear plant at the highest level of security preparedness? If not, how can the NRC be assured that security performance at this level is better than at lower levels of preparedness?
- 3) Has the Nuclear Energy Institute's (NEI) guidance for the proposed industry-designed SPA pilot program been approved by the NRC? If not, when will such approval be forthcoming? Will there be sufficient time for NRC staff, inspectors and contractors to familiarize themselves with the final guidance before the pilot program commences so that they can assess the program effectively?
- 4) Under the SPA program, will NRC evaluate the performance of pilot plants during the evaluated exercise and require immediate correction of any identified security vulnerabilities, or will it confine itself to evaluating only how the exercise is conducted and evaluated by the licensee? How will the public have confidence that adequate security will be maintained at these plants during the pilot?
- 5) Under the proposed Temporary Instruction for NRC observation of the SPA pilot program, NRC will not be able to participate actively in tabletop drills and will not be able to choose scenarios for force-on-force testing, which is a departure from the current practice under OSRE. Under these restrictions, how will NRC be able to independently assess whether the licensees' evaluated exercises are sufficiently challenging and are aimed at potential weaknesses in protective strategies, rather than known strengths?
- 6) The NRC has stated that it envisions the SPA pilot program will serve as a test bed for concepts that may be incorporated into the revision of 10 CFR §73.55. NRC's proposed revision includes an expansion of performance testing to incorporate plant operating modes other than full power, as well as targets such as spent fuel storage areas. How will NRC ensure that these concepts are tested in the SPA pilot?
- 7) I understand the NRC's position to be that the OSRE program will continue until a new rulemaking is in place that establishes a requirement for performance tests. Such a rulemaking is likely to take several years. Is it your intention to support the OSRE program at the current rate — 6 per year — until a new rule is in place?

- 8) In your October 16, 2001 letter you stated that the NRC has not made a decision to terminate the OSRE program yet, but instead planned on evaluating the results of the industry-sponsored SPA program, in which the industry would test its own security measures, before deciding how to proceed. Why should the Congress or the public have any confidence that industry-designed, supervised, and evaluated tests of its own security systems are adequate? In the aftermath of the September 11<sup>th</sup> attacks, don't you agree that tests of a licensee's security forces should be a federal function, rather than a function delegated to the licensees themselves? If not, why not?
- 9) I understand that, as written, the SPA does not permit NRC "observers" to independently assess potential security weaknesses, as in the OSRE. The OSRE permits/requires NRC inspectors to tour the plant, question insiders at great length, conduct analytic tabletop drills. In contrast, the SPA, as designed and written by the nuclear industry, appears to provide a carefully choreographed and rehearsed demonstration of what the particular plant would want to demonstrate.
  - a) Don't you think that there is an inherent conflict-of-interest in asking the nuclear industry to test itself on power plant security?
  - b) Rather than replace the OSRE program with such a flawed program, wouldn't it be preferable to step up the number of OSRE tests, so that they occurred at least every 2-3 years instead of once every 8 years? If not, why not?
- 10) In the past, the Commission has provided information to me indicating that the nuclear industry's track record in OSREs has not been satisfactory. Is it not true that the NRC has found potential vulnerabilities in OSRE tests of licensees that could lead to core damage or a radioactive release, in 40-50% of all OSREs in recent years?
- 11) What criteria does the NRC use to determine whether a licensee's armed responders have passed or failed an OSRE test? If a licensee whose armed responders have, in an OSRE test, proven unable to protect the plant against an act of sabotage resulting in a core meltdown or radiological release, is this a failure, or is it possible to pass despite this result?
- 12) Please provide a summary of the results of each OSRE test conducted since the inception of this program. This summary should include the following information: Plant tested, security company contracted by the plant at the time of the test, date of test, summary of results of tests (including, but not limited to identification of any security weaknesses identified in the test and the root causes of such weaknesses), and actions taken (if any) by the licensee in response to weakness identified in the test.




**Questions on Security Measures Taken at Nuclear Facilities in Other Countries**

- 1) Several press reports have stated that French and Canadian authorities have decided to place anti-aircraft weaponry at some or all of their nuclear facilities. What does the NRC recommend regarding taking the same measures in the U.S.? Does the NRC feel that the actions taken by France and Canada are unnecessary? Why is it that National Guard units are currently deployed at some plants and not at others? Shouldn't there be a uniform national policy on this matter – particularly in periods of heightened alert?
- 2) In your October 16, 2001 letter to me, you stated that "The Commission believes that the baseline security level at U.S. commercial nuclear reactors is very high compared with most other nations" and that "We are aware of no other regulator who systematically carries out security inspections involving force-on-force exercises." Has the Commission considered expanding its international programs with foreign nuclear regulatory authorities to include programs to enhance security at foreign nuclear facilities, particularly in light of the recent warning by the International Atomic Energy Agency (IAEA) regarding the heightened threat to nuclear facilities worldwide? If not, why not. If so, what are you planning?
- 3) In your October 16, 2001 letter to me, you state that the Swiss nuclear authorities have required that "nuclear power stations shall be protected against the consequences of an airplane crash" and that these guidelines are intended to insure that in the event of an airplane crash, "the radiation exposure of the public shall not exceed the limits specified."
  - a) What design features have been required as a result of these guidelines?
  - b) Is the Commission aware of any other nations that have similar requirements? Please compare the Swiss, and any similar requirements in other nations, to the Commission's requirements for domestic licensees with respect to the protection of nuclear power plants against airline crashes?

Thank you for your assistance and cooperation in responding to this request. Should you have any questions about this inquiry, please have your staff contact Mr. Jeffrey S. Duncan or Dr. Michal Freedhoff of my staff at 202-225-2836.

Sincerely,



Edward J. Markey  
Member of Congress

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November 19, 2001

The Honorable Richard A. Meserve  
Chairman  
Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Chairman:

I am writing to request your assistance in answering some questions regarding the security of spent nuclear fuel and decommissioned nuclear reactors against a terrorist attack. I am concerned that an attack on such a facility could lead – in the worst case – to a devastating release of radioactive materials, causing an increase in cancers to the surrounding population, leaving entire communities uninhabitable for decades and costing millions if not billions of dollars to remediate. Unfortunately, these facilities historically appear to have been held to lower security standards than operating reactors, leaving them even more vulnerable to attack.

While your October 16, 2001 letter to me appears to indicate that the Commission regards the consequences of an aircraft impact on spent nuclear fuel casks as minimal, I have directed my staff to review publicly-available NRC and other documents on this subject. These publications appear to have concluded that a successful terrorist attack on spent nuclear fuel could have the same impact as a 10-kiloton nuclear bomb, in terms of radioactive release. Moreover, I noted that the analysis included in your October 16, 2001 of the consequences of fire due to an aircraft impact on a spent fuel cask continues to be based on an assumption that an aircraft would only contain 200 gallons of fuel, and ignores my September 21, 2001 request that such an analysis consider the impact of a fire fed by more than 20,000 gallons of jet-fuel, an amount that is typically carried by Boeing 757s or 767s. I therefore require further clarification of the facts relating to this matter, so that I can fully understand the nature and adequacy of Commission and licensee actions in this area.

I am also concerned that the NRC does not appear to have adequately prepared for terrorist attacks at spent nuclear fuel storage sites or decommissioned reactors. For example, on June 4, 2001, NRC document SECY-01-0100 entitled "Policy Issues Related To Safeguards, Insurance, And Emergency Preparedness Regulations At Decommissioning Nuclear Power Plants Storing Fuel In Spent Fuel Pools" was published. The stated purpose of this document was to "present the Commission with policy issues and options related to regulatory decision-making in the areas of insurance, emergency preparedness (EP), and safeguards for decommissioning nuclear power plants and to request Commission approval of staff recommendations." However, while the NRC SECY document considers the possibility that radioactive

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materials could be released from these facilities due to a zirconium fire and have "significant offsite radiological consequences", it explicitly chooses to ignore the possibility that such a fire could be started by a terrorist. The NRC SECY document did, however, inexplicably conclude that an earlier NRC decision to reduce certain insurance, emergency preparedness and safeguards requirements at decommissioned plants was acceptable, and recommends that offsite Emergency Preparedness be incrementally reduced and eventually eliminated after a reactor permanently shuts down. It seems to me that such conclusions need to be revised in the aftermath of the events of September 11<sup>th</sup>.

Another issue of concern is a proposal to create a spent nuclear fuel storage facility at Skull Valley, Utah. I understand that under this proposal the entire current United States inventory of commercial spent nuclear fuel, 40,000 metric tons, potentially will be concentrated in one location in dry storage casks that will be easily visible from the air and from a nearby road. The facility will also be located extremely close to military installations and commercial jetways. The State of Utah, which opposes the proposal, contends that the proposed operator of the facility, Private Fuel Storage LLC (PFS), failed to assess the impacts from suicide mission terrorism and sabotage that could occur at the facility (or in related activities) in its September, 2000 Safety Analysis Report (SAR), Environmental Report (ER), September 2000 Safety Evaluation Report (SER), and the NRC's draft Environmental Impact Statement (DEIS).

Given the serious risk to public health, safety and the environment that would be posed by a successful terrorist attack on a spent nuclear fuel storage cask or facility, and given that your October 16 response was incomplete in its discussion and analysis of these matters, I request your prompt assistance in responding to the following questions:

#### **Questions on the Security of Spent Fuel Casks Related to the October 16, 2001 Response of the NRC**

- 1) In your October 16 response, you stated that "the capacity of spent fuel dry storage casks to withstand a fire for extended time, such as 24 hours, has not been analyzed, given the very low probability that firefighting personnel would be unable to respond within 24 hours." Firefighters responded in far less than 24 hours to the fires that resulted at the Pentagon and World Trade Center, but they took far longer to extinguish these fires because of the amount of jet fuel and other debris involved. If such a fire, fed by more than 20,000 gallons of jet-fuel, also involved the dispersal of highly radioactive materials, this could hinder firefighters' ability to immediately contain the fire. In fact, it took almost 200 firefighters 4.5 hours to extinguish the more than 30 fires started after the Chernobyl reactor exploded, except for the graphite core fire, which took more than 9 days to extinguish – after most of the radioactive materials had been released into the environment. [Given the risks involved and the record at the World Trade Center [and Chernobyl], don't you think you should perform a worst-case analysis involving a long-duration fire at a spent

fuel storage cask facility, rather than just assuming that such a fire could never occur? If not, why not?

- 2) Your October 16 response restates earlier NRC claims that a worst-case analysis of aircraft impact indicates that the jet-fuel would burn off in a matter of minutes. You conclude that therefore, "a spent fuel storage cask would not be expected to be appreciably affected by a fire." However, as I pointed out in my September 21 letter, this analysis was based on an assumption that there would only be 200 gallons of fuel involved, not more than 20,000 gallons as is typically contained in a 757 or 767. Please clarify your response. Exactly how much fuel did your worst-case analysis assume would be present in a fire? If the amount is not typical of the amount carried by a fully-fueled large commercial aircraft, please redo your worst-case analysis and provide it to me, indicating as well whether the results will necessitate additional security measures at spent fuel storage facilities.
- 3) In your October 16 response, you stated that "Even if a spent fuel cask were impacted and penetrated by a commercial aircraft, the resultant effects could never be equivalent to a Chernobyl-style accident because the amount of radioactive material contained within the cask is orders of magnitude less than in an operating reactor, and the mechanisms for dispersal are fewer than were present during the Chernobyl accident." However, a November 2, 2001 report in the New York Times cites a September 2000 NRC report, that "suggests that breaching a cask used to store spent fuel would create a lethal radiation dose in an area many times larger than that caused by a 10- kiloton nuclear weapon." The New York Times report also states that "other experts note that the spent fuel pools can contain 20 to 30 times as much radioactive material as the reactor core does.... A draft study by the National Council on Radiation Protection and Measurements discussed the risk of shipping spent fuel and calculated that breaching a cask could produce a lethal radiation dose in an area of 2,700 square kilometers. In comparison the study said a 10-kiloton nuclear blast would produce those doses in 47 square kilometers."
  - a) Please explain the apparent discrepancy between your October 16, 2001 statement regarding the consequences of an aircraft impact on a spent fuel cask with those reportedly made in the September 2000 NRC report and the draft NCRP report. Please additionally provide a copy of the September 2000 NRC report.
  - b) Is the statement that a spent fuel pool can contain 20 to 30 times as much radioactive material as an operating reactor true? Please provide a list of each operating reactor and each spent nuclear fuel pool, indicating for each how much radioactive material is contained within. Should this information be nonpublic, please advise your staff to make appropriate arrangements with my staff for transmittal and safekeeping of these documents.
  - c) Is the statement reportedly contained within the September 2000 NRC report that "suggests that breaching a cask used to store spent fuel would create a lethal radiation dose in an area many times larger than that caused by a 10- kiloton nuclear weapon" true? If so, how is this consistent with your statement in your October 16 response that the only consequence of such an event that you could

not exclude is "localized impacts?" Would you consider a radiation release equivalent to that of a 10-kiloton nuclear bomb to be a "localized" event?

**Questions Related to Emergency Preparedness Regulations At Decommissioning Nuclear Power Plants Storing Fuel In Spent Fuel Pools**

- 1) Prior to September 11, 2001, were all spent fuel and dry cask storage areas protected by: a) permanent or temporary personal and vehicle barriers, and, b) armed guards? Are such areas currently so protected? If not, aren't they vulnerable to either attack by terrorists on foot or by truck bombs?
- 2) Can either hand-placed or truck-delivered explosives penetrate either a pool or cask? What could happen if explosives or heat-producing material were placed next to the fuel in an emptied pool or in a breached dry cask?

On June 4, 2001, NRC document SECY-01-0100 entitled "Policy Issues Related To Safeguards, Insurance, And Emergency Preparedness Regulations At Decommissioning Nuclear Power Plants Storing Fuel In Spent Fuel Pools" was published. The stated purpose of the SECY document was to "present the Commission with policy issues and options related to regulatory decision-making in the areas of insurance, emergency preparedness (EP), and safeguards for decommissioning nuclear power plants and to request Commission approval of staff recommendations."

- 3) The SECY document states that revisions to the regulatory requirements for decommissioning nuclear power plants were initiated in the early 1990s because existing regulations "present a significant burden to decommissioning licensees without apparent commensurate safety benefits."
  - a) Were the safety benefits of protecting decommissioning nuclear power plants from acts of radiological sabotage or theft explicitly considered when the decision was made to revise these regulations beginning in the early 1990s? Please provide copies of any analyses done on the impact of changing these regulations on the ability to protect decommissioning facilities against terrorist attacks.
  - b) Were force-on-force exercises or other safety and security evaluations conducted at decommissioned facilities to verify that revising the regulations would pose no degradation in safety, compared to the old rules? If not, then on what basis was it determined that the pre-existing requirements did not provide commensurate safety benefits?
- 4) The SECY document states that "the only postulated scenario at a decommissioning plant that could result in a significant offsite radiological release is a beyond-design-basis event commonly referred to as a zirconium fire." Why were terrorist attacks at a decommissioning plant not "postulated scenarios?" Will the Commission revise its analysis of the scenarios in which a significant offsite radiological release could occur at a decommissioning plant in light of the events of September 11? If not, why not?

- 5) The document refers to a previous NRC publication, NUREG-1738, in which NRC staff "concluded that the risk from a spent fuel pool (SFP) zirconium fire at decommissioning plants is very low and well below the Commission's safety goals for operating reactors." The document describes the manner in which such a fire would take place as beginning with "a substantial loss of water from the spent fuel pool (SFP), uncovering the spent fuel. Uncovering the spent fuel could result in a heatup to the point where the fuel's zirconium cladding might begin to oxidize in a rapid, exothermic, self-sustaining reaction. The plume from such a zirconium fire could have significant offsite radiological consequences."
  - a) Couldn't a terrorist start such a fire by draining the water from the spent fuel pool and then causing an explosion nearby? Why wasn't that considered?
  - b) Will the NRC revise its estimation of the likelihood of such a fire in light of the events of September 11? If not, why not?
- 6) The document states that "the study concluded that the possibility of a zirconium fire cannot be dismissed even many years after final reactor shutdown."
  - a) Do you agree that this conclusion means that security at decommissioned plants must remain high at least until all the spent fuel removed from the site? If not, why not?
  - b) What steps has the NRC taken at decommissioned plants since September 11 to ensure that a terrorist attack on the spent fuel pool does not result in a fire and/or large release of radioactive materials? If no such steps have been taken, please justify.
- 7) A previous NRC ruling (SECY-93-127, "Financial Protection Required of Licensees of Large Nuclear Power Plants During Decommissioning," July 13, 1993) reduced certain insurance, emergency preparedness and safeguards requirements at decommissioned plants because the possibility of a zirconium fire resulting in a large release of radioactive materials had been ruled out. In light of the June, 2001 finding that such an event cannot be ruled out, as well as in light of the highlighted risk that a terrorist could cause such an event, will the NRC reverse its 1993 decision to reduce certain insurance, emergency preparedness and safeguards requirements at these plants? If not, why not?
- 8) The document found that the risk of a zirconium fire was dominated by the likelihood that a major earthquake would occur. However, the likelihood of sabotage was not even considered. Why would an analysis of any event that could result in a large release of radioactive material not even attempt to consider sabotage? Will the NRC redo this and other analyses of events that could result in a large release of radioactive materials in light of the events of September 11? If not, why not?
- 9) The document states that "regulatory changes for insurance or offsite emergency preparedness would be premised on the assumption that the level of safeguards maintained at a decommissioning plant would provide high assurance that the likelihood of a zirconium fire due to sabotage is very low." Was this assumption based on the results of Operational Safeguards and Response Evaluation exercises at decommissioned plants to determine whether a terrorist would be able to succeed

in starting a zirconium fire? If so, please list the number of decommissioned plants that have undergone such exercises, the name of the security company contracted to the licensee, the results of such exercises, as well as the number of decommissioned plants at which potential vulnerabilities were identified. If not, then on what possible basis was the assumption made?

- 10) The SECY document recommends that because of the severe consequences of a zirconium fire, the Commission's Safety Goal policy statement, which currently applies only to operating reactors, also apply to decommissioned plants until the spent fuel is removed from the spent fuel pools. Has this recommendation been adopted? If not, why not, especially in light of the events of September 11?
- 11) The report states that it would be difficult for the Commission to utilize probabilistic risk assessment techniques to evaluate the risk of a sabotage event, stating that Intelligence Agencies do not use these techniques either. Does this conclusion mean that the NRC will just ignore the risk of a zirconium fire being caused by sabotage entirely, as the document suggests?
- 12) The document recommends that a safeguards protection goal for decommissioning nuclear power plants that "consists of a design criterion of protecting against radiological sabotage by the design basis threat and a performance standard of preventing spent fuel sabotage that could cause radiation exposure to an individual at the nearest controlled area boundary from exceeding the dose specified in 10 CFR 72.106 (5 rem at a minimum of 100 meters)." Has the Commission adopted this recommendation? If so, will it be overseen through the use of Operational Safeguards Response Evaluation exercises, and if not, how will you know the safeguards protection goal is being achieved? If the Commission has not adopted this recommendation, why not?
- 13) The document recommends that "insurance requirements be substantially reduced shortly after a reactor permanently shuts down and enters into decommissioning. These licensees would not be required to participate in the secondary retrospective rating pool and primary insurance coverage would be reduced to about \$100 million. In addition, onsite property damage insurance would not be required 60 days after permanent shutdown." This recommendation was made on the assumptions that a zirconium fire was not possible and that acts of sabotage would be prevented. Does NRC plan to reduce insurance at decommissioning plants now that it is clear that the possibility of a zirconium fire cannot ever be ruled out, and in light of the events of September 11? If so, please fully justify the decision.
- 14) Has the NRC ever conducted an analysis of how much a large scale release of radioactive materials due to a zirconium fire would cost, including the costs of decontamination and addressing health impacts of such an event on the surrounding community? If so, what is the cost of a worst-case scenario? If not, how can the Commission make an informed decision as to how much insurance coverage a decommissioned plant should have?

- 15) The document recommends that offsite Emergency Preparedness be incrementally reduced and eventually eliminated after a reactor permanently shuts down. Did this recommendation take into consideration the risk of a terrorist attack on the facility? Since the risk exists that a terrorist could start a zirconium fire by merely draining the spent fuel coolant, why would emergency preparedness be reduced before all the spent fuel was removed from the site? How does this recommendation make sense in light of the other recommendation that the Commission's Safety Goal policy statement, which currently applies only to operating reactors, also apply to decommissioned plants until the spent fuel is removed from the spent fuel pools?
- 16) The document concludes that back-fit exemptions from NRC requirements on decommissioned plants previously granted under the assumption that a zirconium fire was not possible do not "present an undue risk to the public health and safety."
- a) Does the NRC still agree with this statement?
  - b) How is such a conclusion possible, given the document's conclusion that the risk of such a fire cannot be dismissed until the spent fuel is removed from the site, the failure of the analysis to account for the risk of zirconium fires due to sabotage or terrorism, as well as the recommendation that the Commission's Safety Goal policy statement (which currently applies only to operating reactors) also apply to decommissioned plants until the spent fuel is removed from the spent fuel pools?
  - c) Will the NRC revoke its previously granted exemptions in light of the conclusion that the risk of a fire cannot be dismissed, as well as in light of the events of September 11? If not, why not?
- 17) The document assumes that "because of the long spent fuel decay times at currently decommissioning plants, a zirconium fire cannot occur for an extended period of time (at least 20 hours), if it could occur at all, even under the worst-case adiabatic heatup assumptions (no heat transfer of any kind from the fuel assemblies)." This statement seems to be premised on an accidental cause of the zirconium fire.
- a) Would it take 20 hours for a zirconium fire to occur if a terrorist simultaneously drained the coolant and set a fire or caused an explosion? If not, how long would it take in the worst case scenario?
  - b) What is the shortest time a zirconium fire could occur if a large aircraft full of fuel crashed into the spent fuel storage facility?

#### **Questions On The State Of Utah's Petition Related To Security At The Proposed Spent Nuclear Fuel Storage Facility At Skull Valley**

As you know, the State of Utah is an intervenor in a licensing proceeding before the NRC for a spent nuclear fuel storage facility proposed for the Skull Valley Band of Goshute Indian Reservation. The State opposes the siting of the facility in Utah. Following the events of Sept. 11th, the State prepared and filed a new "contention" or concern it has with the proposed facility related to the threat of terrorism as well as a Petition to Suspend the Proceeding with the Commissioners.



The State of Utah contends that the proposed operator of the facility, Private Fuel Storage LLC (PFS), failed to assess the impacts from suicide mission terrorism and sabotage that could occur at the facility (or in related activities) in its September, 2000 Safety Analysis Report (SAR), Environmental Report (ER), September 2000 Safety Evaluation Report (SER), and the NRC's draft Environmental Impact Statement (DEIS).

According to the petition, under the PFS proposal, the entire current United States inventory of commercial SNF, 40,000 metric tons, potentially will be concentrated in one location in dry storage casks. Four thousand HI-STORM 100 casks will be stored out in the open on concrete pads over a 99-acre area. The casks are approximately twenty feet high and eleven feet in diameter (DEIS at Table 2.6), and the mass accumulation of these casks would be easily visible from the air, from Skull Valley Road, and from other unimproved roads near the site. No other nuclear facility currently amasses this enormous volume of SNF above ground in one location.

- 1) 10 CFR section 72.94 requires that a Safety Analysis Report (SAR) must identify and adequately address design basis external man-induced events such as suicide mission terrorism and sabotage "based on the current state of knowledge about such events." Given that the events of September 11 have forever altered our "state of knowledge" about the nature of such threats, do you plan to require PFS to amend its SAR to address the risk of suicide mission terrorism and sabotage? If not, why not?
- 2) The State of Utah also contends that PFS's Environmental Report (ER) and the NRC's Draft Environmental Impact Statement (DEIS) are too limited to comply with the National Environmental Policy Act and 10 CFR §§ 72.34, 51.45, 51.61 and 51.71, because they do not adequately identify and evaluate any adverse environmental effects which cannot be avoided from attacks by suicide mission terrorism or sabotage. The State of Utah filing states that "events of September 11<sup>th</sup> and their aftermath require a change in scope of the ER and DEIS to include an analysis "of Federal policy, including factors not related to environmental quality ... [that] are relevant to the consideration of environmental effects of the proposed action." 10 CFR § 51.71(d)." Do you plan to require PFS to amend its ER in light of the events of September 11? If not, why not? Do you plan to amend the DEIS in light of the events of September 11? If not, why not?
- 3) According to the State of Utah, the location of the proposed PFS facility, in the middle of Skull Valley, is surrounded by critical military installations vital to national security – installations such as the Utah Test and Training Range, Dugway Proving Ground, Deseret Chemical Depot, and the Tooele Army Depot – and only 12 to 15 miles away from commercial jetways, and presents an opportune target for suicide mission terrorism. The transportation of spent nuclear fuel to the proposed facility

and casks stored at the Intermodal Transfer Facility (ITF, which is located right underneath a commercial jetway) also present exposed terrorist targets. The facility is about 45 miles from a large metropolitan area, 50 miles from Salt Lake City International Airport, and the ITF will be able to be seen from Interstate 80. What additional measures will NRC require PFS to take to ensure the safety of the spent nuclear fuel, as well as the safety of the surrounding sensitive facilities in the event of an accident or terrorist attack? If no additional measures will be required, please fully justify your decision.

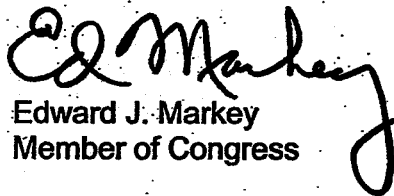
- 4) According to the SAR, PFS plans to store spent nuclear fuel in Holtec International HI-STORM 100 Casks. The HI-STORM is designed to withstand an impact of a 1,800-kg (3,968 lb) car moving at a speed of 126 mph (SAR, Rev 17 § 8-2.2.2). The HI-STORM 100 cask consists of 0.75 inch outside steel liner, 26.75 inches of 4,000 psi concrete, and a 2-inch thick inner steel liner for a total of 29.5 inches. The steel canister is 0.5 inches thick. According to the petition, a U.S. Department of Energy report determined that a Boeing 757 traveling between 422 and 500 miles per hour could penetrate between 28 to 33.6 inches of concrete and between 1.47 and 1.85 inches of steel. Clearly, a Boeing 757 commercial airliner, which on September 11 was traveling at 480 mph or greater, would be able to penetrate the HI-STORM casks and canisters. How will the NRC ensure that the storage casks are protected from an attack such as the one that occurred on September 11?
- 5) According to the SAR, PFS plans to transport spent nuclear fuel in a Holtec International HI-STAR 100 shipping cask. The HI-STAR 100 is required to withstand a 30 mph drop onto an unyielding surface (10 C.F.R. § 71(c)(1)), not to withstand a 255,000-pound Boeing 757 traveling 500 miles per hour. How will the NRC ensure that the shipping casks are protected from an attack such as the one that occurred on September 11?
- 6) According to the SAR, the Canister Transfer Building (CTB), where the transfer of PFS canisters from shipping casks to storage casks will occur, has two foot thick walls and an eight inch thick roof and is designed to withstand a 3,990 pound car moving at 91 mph. In addition, according to the ER, PFS's proposed Intermodal Transfer Facility (ITF), located 1.8 miles west of Rowley Junction, will consist of a pre-engineered metal shell to provide weather protection, but no additional protection against terrorist attacks. What measures will NRC require PFS to take to ensure that the CTB and ITF are better able to protect against terrorist attacks such as those of September 11? If no additional measures will be required, please fully explain the NRC decision.
- 7) According to the SAR, HI-STORM casks are required to withstand a 1,475 °F for 15 minutes, while HI-STAR shipping casks are required to withstand a fire of 1,475 °F for 30 minutes. According to a 1976 Sandia National Laboratories study, jet fuel

burns at an average temperature of 1,850 °F, and the fires that resulted at the World Trade Center and Pentagon burned for hours. What actions will NRC take to ensure that storage and shipping casks for spent nuclear fuel can withstand hotter fires of longer duration than 15 minutes? If no actions are planned, please fully explain why not.

- 8) The CTB, where the transfer of PFS canisters from shipping casks to storage casks will occur, is designed to withstand a 300 gallon diesel fuel fire for 16 minutes. What actions will NRC take to ensure that this facility can withstand a fire involving more than 20,000 gallons of fuel (the amount typically held in large aircraft)? If no actions are planned, please fully explain why not.
- 9) The State of Utah provided some expert calculations related to the amount of radionuclides that would be released into the environment in the event of a commercial airline crash into the proposed spent fuel storage facility. These calculations showed that the consequences of such an event would cause the release of radioactivity at levels far higher than NRC limits for distances of tens of miles. Has NRC verified these calculations? If so, what actions do you plan to take to ensure that such an event does not occur? If not, why not?

Thank you for your assistance and cooperation in providing responses to these questions. Should you have any questions about this inquiry, please have your staff contact Mr. Jeffrey S. Duncan or Dr. Michal I. Freedhoff of my staff at 202-225-2836.

Sincerely,

  
Edward J. Markey  
Member of Congress

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November 27, 2001

The Honorable Richard A. Meserve  
Chairman  
Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Chairman:

I am writing to request clarification regarding what actions have been taken over the years by the Commission and its licensees to protect against the impact of a large commercial aircraft on a nuclear reactor, and the consequences of such an event if it were to result in the shut-down of the external electricity supply or secondary cooling system of the reactor.

Immediately following the events of September 11, spokespersons for both the Nuclear Regulatory Commission as well as the nuclear industry made public statements indicating that a large commercial aircraft would not be able to penetrate the containment structure of a nuclear reactor. For example, on September 18, 2001, a story in Dow Jones Newswire stated:

"U.S. Nuclear Regulatory Commission spokesman William Beecher stood firmly behind the agency's assurances, offered last week in the wake of the attacks on the World Trade Center and the Pentagon, that the steel and cement containment structures ringing U.S. nuclear reactor cores would hold back a crashing airplane. "It is the considered opinion of the NRC that these are very robust, and it is unlikely that a large airliner could penetrate the containment," Beecher said.... "It is still the NRC's belief that the containment can't be penetrated," he said."

Then, just 3 days later, on September 21, 2001, the NRC issued a press release that stated:

"However, the NRC did not specifically contemplate attacks by aircraft such as Boeing 757s or 767s and nuclear power plants were not designed to withstand such crashes. Detailed engineering analyses of a large airliner crash have not yet been performed."

The Commission made identical statements in your letter to me dated October 16, 2001. Shortly after I received your letter, however, a 1982 study

written for the NRC by Argonne National Laboratory was found in NRC's public reading room by a public interest group. That report was in fact a detailed engineering analysis of a large airliner crash on a nuclear reactor, and it and other press reports referenced numerous other similar NRC analyses.

While the NRC was modifying its public stance on the ability of nuclear plants to withstand aircraft attacks, the nuclear industry has continued to maintain that existing power plants are fully capable of withstanding a strike by a large commercial aircraft. Spokespersons from the Nuclear Energy Institute have been quoted in numerous news articles over the last several weeks as claiming that the plants could withstand such an attack, and the NEI web site contains the following statement:

Nuclear plants are equipped for, and prepared to defend against, most types of attacks. They are structurally fortified to withstand the impact of natural forces like hurricanes and tornadoes and airborne objects up to a very substantial force.

Reactors at nuclear power plants are enclosed in containment buildings made of steel and reinforced concrete up to four feet thick. Containments at nuclear power plants along the glide paths into airports are designed to withstand airliner accidents.

In light of these statements by the Commission and by the industry, I have directed my staff to carefully review the Argonne report. Based on this review, I am concerned by what appear to be conflicting and possibly inaccurate statements by the NRC and the nuclear industry regarding this matter.

It appears that the NRC and the nuclear industry have been downplaying the risk of a terrorist attack on a nuclear reactor on the basis of containment structures that have not been engineered to withstand the impact of a large commercial aircraft. But it also appears that the consequences of an aircraft (or truck bomb, or other) attack on the auxiliary facilities at a nuclear reactor could be a core meltdown and release of radioactivity into the surrounding communities. In other words, an aircraft would not even necessarily have to penetrate the containment structure in order to cause a catastrophic core meltdown.

For example, the Argonne report states that "a crash of an aircraft on a switchyard would very likely eliminate the plant's offsite power.... Should massive electrical failure leading to total loss of power be possible (with the diesel generators failing or unable to deliver power because of short circuits or other equipment failures) it would leave the plant vulnerable to core melt." It also states that if the secondary cooling system as well as the external electrical power were attacked, the result would be a re-criticality of the core, even if the containment structure wasn't penetrated at all

by the attack on or accident at the reactor. The Argonne report concludes that in such circumstances, "the core would most probably be headed for serious damage if not total meltdown. Core meltdown, without the availability of electrical power, would probably result in containment over-pressurization and release of radioactive materials to the environment far in excess of 10 CFR 100 guidelines."

In light of the serious public health and safety issues raised by this situation, I request your prompt assistance in answering the following questions.

**Questions about NRC and Industry Efforts to Assure the Ability of a Reactor to Withstand the Impact of a Large Airplane**

An October 7 article in the St. Louis Post-Dispatch contained the following excerpt:

"The design standards called for the plants to withstand the accidental crash of a 727, an early passenger jet. Beginning in the mid-1970s, many NRC engineers responsible for safety design at new plants fought to strengthen the standards so plants would be protected from larger aircraft that were being flown at the time or on the design boards. The issue hit critical mass while the Seabrook plant in New Hampshire was being licensed for construction in 1976 and the Three Mile Island Unit 2 plant near Harrisburg was being rebuilt after its near meltdown in 1979. Both plants are situated in the flight paths of major airports. Dozens of reports were prepared by NRC's engineers documenting that even Seabrook's double containment might not withstand the impact of a 747, let alone newer, larger aircraft. Nuclear industry lobbyists opposed any plan to increase the strength of the containment, and the agency ended its internal debate."

- 1) Is it true that beginning in the mid-1970s, many NRC engineers responsible for safety design at new plants fought to strengthen the standards so plants would be protected from larger aircraft that were being flown at the time or on the design boards?
- 2) If so, were such efforts opposed by the nuclear utilities industry?
- 3) Why weren't the strengthened standards adopted?
- 4) Please provide copies of all of the NRC engineering reports, studies or memoranda prepared during this period that raise questions or concerns about the ability of nuclear power plants (including but not limited to Seabrook's double containment structures) to withstand the impact of a 747 or a larger aircraft.
- 5) Why did the NRC state first that reactors could withstand the impact of a large aircraft, and then subsequently that no such engineering analysis had ever been performed, if numerous reports had been prepared by NRC staff or

NRC contractors or consultants indicating that even the strongest containment system could not survive such an event?

- 6) In your October 16, 2001 letter to me, you stated that "the NRC has not routinely required all plants to be designed to withstand a particular aircraft crash, but such considerations have entered into siting evaluations."
- a) Which plants has the NRC required be designed to withstand a particular airline crash?
  - b) What types of airplane crashes are these plants designed to withstand?
  - c) What types of design features, structures, systems, components, and shut down features have been required for these plants?
  - d) In light of the September 11<sup>th</sup> events, does the NRC view these design features, structures, systems, components, and shut down features to be adequate to protect such plants against a hit by a large commercial aircraft?
  - e) In light of the events of September 11<sup>th</sup>, has the NRC considered requiring other licensees to undertake retrofits to incorporate similar design features, structures, systems, components, and shut down features? If not, why not?

**Questions on the June 1982 Argonne National Laboratory Study entitled "Evaluation of Aircraft Crash Hazards Analyses for Nuclear Power Plants"**

In June 1982, Argonne National Laboratory (ANL) published a study prepared for the NRC entitled "Evaluation of Aircraft Crash Hazards Analyses for Nuclear Power Plants."

- 1) Why did NRC state that "detailed engineering analyses of a large airliner crash have not yet been performed" in its September 21, 2001 press release given that this study was prepared for the NRC and found in NRC's reading room?
- 2) The report concludes that "Aircraft crashes may result in multiple failure initiating events, and a propagating failure originating with a nonsafety system malfunction may be possible." Do you agree with this statement? If not, why not?
- 3) The report stated that an NRC Task Force, based on the assumption that a plane crash at a nuclear reactor would be an accidental occurrence, recommended that reactors should only be sited 5 miles or further from airports. This Task Force published its recommendations in NUREG-0625. Did the NRC adopt the task force's recommendation? If not, why not? Are any of the U.S. nuclear facilities located less than 5 miles from an airport? If so, please list them.

- 4) The Argonne report states that "A review of past nuclear power plant siting experience indicated that hazards arising from aircraft crashes were analyzed in at least 12 cases in the U.S.A."
  - a) Please provide copies of all such analyses.
  - b) What actions, if any, resulted from the analyses performed at these plants. If no actions resulted, why not?
  - c) Why did NRC state that "detailed engineering analyses of a large airliner crash have not yet been performed" in its September 21, 2001 press release, and in your October 16, 2001 letter to me, given the fact that these analyses apparently existed?
  - d) Have any subsequent analyses been conducted of this matter? If so, please provide me with copies of such analyses.
- 5) According to the report, Germany requires essentially all nuclear containment structures to withstand the crash of certain types of military and commercial aircraft, and the International Atomic Energy Agency has also recommended a systematic approach to the problem of aircraft hazards.
  - a) Does the NRC require its licensees to follow the IAEA system? If not, why not?
  - b) Given that the NRC was aware that other nations required nuclear containment structures to be able to withstand the crash of certain types of military and commercial aircraft as long as 20 years ago, why didn't it require U.S. nuclear facilities to ensure they had the same capabilities?
- 6) The report states that while the control rods can be dropped quickly without electrical power to halt a core meltdown, this will only succeed in bringing the plant from full power down to hot standby conditions. Bringing the plant down to cold shutdown conditions would require the injection of boron, which does require electrical power.
  - a) How long can a reactor stay in hot standby mode before it becomes a problem, in the event that electrical power is shut down by a terrorist attack or accident?
  - b) Please describe the consequences of a prolonged electrical power shutdown on the reactor. How long would it take before a core meltdown was initiated?
- 7) The report states that the "condenser and condenser cooling water system, parts of the feedwater system and the steam lines, as well as the water intakes and ultimate heat sink(s) are not protected inside hardened structures; they are thus vulnerable to direct impact. Moreover, though the residual heat removal system itself is fully contained in the hardened containment and auxiliary buildings, its intermediate heat removal circuit and ultimate heat sink are not protected in that way."



- a) What would happen if any of these auxiliary structures were destroyed by an airplane crash, truck bomb, or other means of attack or accident?
  - b) Will the NRC be requiring these auxiliary structures to be better protected in the future in order to prevent releases of radioactive materials? If not, why not?
- 8) The report states that "A crash of an aircraft on a switchyard would very likely eliminate the plant's offsite power.... Should massive electrical failure leading to total loss of power be possible (with the diesel generators failing or unable to deliver power because of short circuits or other equipment failures) it would leave the plant vulnerable to core melt."
- a) Do you agree with these statements? If not, why not?
  - b) How long would it take after an attack or accident caused a massive electrical failure for a core melt of the reactor to occur?
- 9) The report states that "additional ways in which a nuclear power plant could be seriously affected, different from a direct impact on a hardened structure, would be by impact on systems affecting long-term heat removal capability, such as the turbine hall (severing the steam lines) and the water intakes. It should be kept in mind that the combined effects of impact and fire due to an aircraft crash open the possibility for numerous multiple failures;"
- a) Do you agree with these statements? If not, why not?
  - b) How long would it take for a core melt of the reactor to occur if the long-term heat removal capabilities were destroyed? What are you doing to ensure that this will not occur?
- 10) According to the report, if the secondary cooling system of the plant and a total electrical power failure were to simultaneously occur at a reactor, the result would be a re-criticality of the core, even if the containment structure wasn't penetrated at all by the attack on or accident at the reactor. It concludes that in these circumstances, "the core would most probably be headed for serious damage if not total meltdown. Core meltdown, without the availability of electrical power, would probably result in containment over-pressurization and release of radioactive materials to the environment far in excess of 10 CFR 100 guidelines."
- a) Do you agree with the report's conclusion that it would be possible for terrorists to cause a core melt at a nuclear reactor even without breaching the containment? If not, why not?
  - b) What steps are you taking to protect the electrical power supply and secondary cooling systems of the reactors, especially in light of the events of September 11?
  - c) Have these systems' security been tested using Operational Safeguards Response Evaluation exercises at any of the nation's nuclear facilities? If

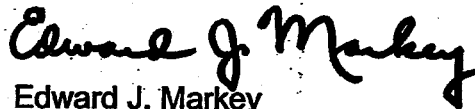
The Honorable Richard A. Meserve  
November 27, 2001  
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so, what were the results? If not, then how do you know such systems are not vulnerable to terrorist attack?

11) The Argonne report concludes that "based on the review of past licensing experience, it appears that fire and explosion hazards have been treated with much less care than the direct aircraft impact and the resulting structural response. Therefore, the claim that these fire/explosion effects do not represent a threat to nuclear power plant facilities has not been clearly demonstrated." Has the NRC analyzed the threat of fire/explosion effects associated with an aircraft impact since the Argonne report was published in 1982? If not, why not, and do you plan to do so now, in light of the events of September 11?

Thank you for your assistance and cooperation in this matter. Should you have any questions about this request, please have your staff contact Mr. Jeffrey S. Duncan or Dr. Michal I. Freedhoff of my staff at 202-225-2836.

Sincerely,

A handwritten signature in black ink that reads "Edward J. Markey". The signature is written in a cursive, flowing style.

Edward J. Markey  
Member of Congress

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December 4, 2001

The Honorable Richard A. Meserve  
Chairman  
Nuclear Regulatory Commission  
Washington D.C. 20555

Dear Mr. Chairman:

Documents uncovered in Kabul, published interviews with and statements by Al Qaeda members, and other evidence all indicate that terrorists may be actively seeking to acquire nuclear materials for a nuclear explosive device, or even a crude radiological explosive device. Today's Washington Post reports that Osama bin Laden and his Al Qaeda terrorist network may have made greater strides than previously thought toward obtaining plans or materials to make a crude radiological weapon that would use conventional explosives to spread radioactivity over a wide area. And last week, former CIA Director James Woolsey co-authored an article in the New York Times that warned:

"A deeply disturbing picture of terrorist intent has emerged in recent weeks as blueprints for building nuclear weapons have been discovered in the wreckage of abandoned Al Qaeda safe houses. These blueprints and other documents, while largely available in the public domain, sharpen the need for a vigorous American policy to deal with unsecured nuclear, chemical and biological materials. Even if terrorist manufacture of nuclear bombs is unlikely, substantial dangers remain of terrorists using radioactive material in low-tech "dirty" bombs.

"The main nuclear security problem posed by Al Qaeda today is access to radioactive materials in Pakistan. However, for a decade we have focused on the former Soviet Union. Since the end of the cold war, approximately 175 incidents of smuggling or attempted theft of nuclear materials there have been thwarted. But the threat remains, as the Russian Defense Ministry reported on Nov. 6, when the last attempt at theft was made."

While former Director Woolsey's article focused on the threat to nuclear materials abroad, in light of the threat that all such efforts pose to our national security, I would like to once again direct the Commission's attention to an ongoing breach in the security and safeguarding of nuclear materials here at home.

The Honorable Richard A. Meserve  
December 4, 2001  
Page 2

As you will recall, on December 20, 2000 I wrote you regarding an Event Report filed with the Commission (Daily Event Report #37596, December 15, 2000) which indicated that two radioactive spent fuel rods were missing from the Millstone Nuclear Power Station Unit 1. The report suggested that they may have been lost since approximately 1980 and that their loss was discovered only during the course of document reviews undertaken in connection with the decommissioning of Unit 1.

In your February 1, 2001 response to my inquiry, you requested that I "recognize that we are early in our review of this event and are still pursuing clarification of a number of issues." You also indicated that "the licensee is conducting its investigation and we will continue to monitor its actions." You also stated in your letter that:

"...[L]et me emphasize that I share your concerns regarding this issue. Because of the potential health and safety implications, the NRC views the control of spent nuclear fuel to be of great importance. At this point, it is highly likely that the two missing fuel rods are either still located in the Millstone 1 spent fuel pool or are buried at a licensed radioactive waste disposal site, thereby posing little or no threat to public health and safety. However, the NRC will closely monitor and evaluate the licensee's response to this event to assess actions to be taken to preclude future similar events. If the missing fuel rods are buried at a low-level waste disposal site, we will assess what corrective actions may be required."

It is my understanding that the licensee has now completed its investigation into this matter, and submitted a copy of its report to the Commission in September (see "Millstone Unit 1: Fuel Rod Accountability Project Final Report" or "FRAP Report"). In the FRAP Report, the consultants hired by Northeast Utilities reported that "the investigation did not yield clear and convincing evidence of the precise location of the two fuel rods." The FRAP Report further concluded that:

"Specifically, the investigation has determined that the rods are: (a) in an undetermined location in the Unit 1 spent fuel pool; (b) at GE's Vallecitos [CA] nuclear fuel facility; or (c) at one or both of the low-level radioactive waste ("LLRW") disposal facilities in Barnwell, South Carolina ("Barnwell") or the Hanford Reservation in Richland, Washington ("Hanford")."

In other words, the contractor spent \$9 million and concluded that it cannot find the two missing fuel rods. I understand that subsequent to the submission of the FRAP report, NRC dispatched investigative staff to Millstone to continue its review of this matter. I would like to know what specific actions are going to be taken by the Commission as a result of the information provided by

the licensee and the investigations of its staff. While it may well turn out that the spent fuel rods were not stolen or diverted, in light of the recent press reports about terrorist efforts to obtain nuclear materials it seems prudent to take every reasonable effort to account for the whereabouts of the rods.

In addition, I recently have been made aware of a report by the Department of Energy's Inspector General, which raises broader questions about the nature and adequacy of controls on nuclear materials by NRC licensees. The findings raised in this report would seem to suggest that the problems identified as a result of the Millstone incident may not be an isolated incident, but evidence of a more generic breakdown in nuclear materials accounting and controls.

In order to more fully understand the Commission's response to the Millstone case, and the overall nature and adequacy of current NRC policies and procedures with respect to the protection of nuclear materials from theft or diversion, I request your assistance and cooperation in providing responses to the following questions:

**Questions Regarding the Disappearance of Two Spent Fuel Rods from the Millstone Unit 1 Spent Fuel Pool (SFP)**

- 1) Your February 1, 2001 letter stated that in accordance with 10 CFR 70.51(c), "a power reactor licensee is required to establish, maintain and follow written material control and accounting procedures that are sufficient to enable the licensee to account for the special nuclear material (SNM) in its possession." In light of the fact that Northeast Utilities apparently has been unable to account for the whereabouts of these two missing fuel rods for more than 20 years, and only uncovered the loss of these fuel rods during document review carried out in connection with the decommissioning of Unit 1, do you believe that the licensee has complied with this requirement? Why or why not?
- 2) Your February 1, 2001 letter also states that "in accordance with 10 CFR 70.51(d), a power reactor licensee is required to conduct a physical inventory of all SNM in its possession at intervals not to exceed 12 months." Given the fact that the two fuel rods apparently were not identified as missing in any physical inventory conducted by Northeast Utilities for over 20 years and were not identified as missing until document reviews conducted in connection with the decommissioning of Millstone Unit 1 in 2000, do you believe that Northeast Utilities has complied with this requirement? Why or why not?
- 3) Your letter states that "in accordance with 10 CFR 70.54(a) and 74.15(a), the licensee must submit a Nuclear Material Transaction Report to the Nuclear Material Management and Safeguards System (NMMSS), operated for both NRC and the Department of Energy, every time its facility transfers (or

receives) SNM." Given the fact that the FRAP report's review suggests that the fuel rods may have been transferred to facilities in California, Washington, or South Carolina, do you believe that the Northeast Utilities' reporting of transfers of SNM have been compliant with this regulation? Why or why not?

- 4) Your letter also states that "in accordance with 10 CFR 70.53(a)(1) and 74.13(a)(1), "at least twice a year, the licensee must submit material balance reports concerning SNM received, produced, possessed, transferred, consumed, disposed of, or lost, and an inventory compensation report to NMMSS." Given the fact that these two fuel rods were unaccounted for 20 years and have still not been found, do you believe that Northeast Utilities has complied with this regulation? Why or why not?
- 5) Your letter also states that there are penalties for transporting of or disposing of materials improperly, based on the circumstances of each case. What penalties have been imposed in this case? What findings preceded those penalties? If no penalties have been imposed, please explain.
- 6) In your February 1, 2001 letter, you stated that a variety of civil and criminal penalties can be imposed for violations of Commission regulations, including fines of up to \$100,000 per day prior to 1986 and fines of up to \$110,000 beginning in 1986. If all of the aforementioned applicable regulations cited in your letter of February 1, 2001 were violated by the licensee in this instance, what would be the maximum civil monetary penalty, assuming full application of the \$100,000-110,000 per day civil penalty mentioned in your letter?
- 7) Your letter indicates that violations of NRC regulations are subject to both civil enforcement actions and criminal penalties and that the NRC staff was still investigating this matter. You further indicate that "when complete, we will apply the Enforcement Policy to determine the appropriate enforcement action." Have you made any determination with respect to what enforcement action the NRC plans to take with respect to this matter? If so, what did you decide? If not, when will you complete your determination?
- 8) Your letter states that "The NRC staff notes...that any civil sanction may be limited by the statute of limitations, 28 USC § 2462, 'Time for commencing proceedings,' which is applicable to the NRC as well as other government agencies." As you know, this statute provides that "Except as otherwise provided by Act of Congress, an action, suit or proceeding for the enforcement of any civil fine, penalty, or forfeiture, pecuniary or otherwise, shall not be entertained unless commenced within five years from the date when the claim first accrued if, within the same period, the offender or the property is found within the United States in order that proper service may be made thereon."

- a) In the case of violations which were not revealed to the Commission for twenty years, when does the government's claim "first accrue" – on the date the violation first occurred or the date when it was first reported to or discovered by the Commission? In your response, please provide the appropriate citations of the case law relating to this specific matter.
  - b) If the licensee's violations continued over a period of 20 years (since they failed to report the missing materials despite regular reporting requirements), how does this affect the applicable statute of limitations?
  - c) Does the Commission believe that a lengthier statute of limitations might be needed to be added to the Atomic Energy Act, inasmuch as 28USC § 2462 explicitly provides that such a longer statute shall apply if Congress has chosen to enact one? If not, can't a licensee simply avoid the imposition of civil penalties by concealing or failing to reveal a violation for five years?
- 9) In your February 1, 2001 letter, you stated that "following the completion of the NRC's inquiry [into the Millstone matter], we will consider whether industry-wide generic action is warranted." In light of what you now know, and in light of both the events of September 11<sup>th</sup> and the International Atomic Energy Agency's recent warning regarding heightened risks of theft or diversion of radioactive materials, do you believe that industry-wide generic action is warranted to assure that other licensees review its inventories of nuclear materials to determine if other discrepancies exist? Why or why not?
- 10) In your February 1, 2001 letter, you say "The NRC staff is still investigating why the Millstone 1 anomaly was not identified in 1980 or in later years by the licensee or NMMS. Based on the results of our investigation, we may elect to require additional actions at other facilities."
- a) Has the NRC staff reached any conclusions regarding why the two missing fuel rods were not discovered by the licensee or NMMS? If so, what did you conclude? If not, when will you complete consideration of this matter?
  - b) Was this just an isolated incident, or evidence of a more widespread phenomenon?
  - c) If the NMMS was unable to identify shipper-receiver differences or inventory differences in this case, does that suggest fundamental problems with the Nuclear Material Accounting Database? If so, what changes will you propose to correct these deficiencies.
  - d) Have you elected to require any additional actions at other facilities as a result of your investigations? If so, please describe them. If not, why not?
- 11) An October 5, 2001 NRC press release reports that "The Nuclear Regulatory Commission staff is sending a team to Millstone Unit 1 to evaluate the comprehensiveness of Northeast Utilities' investigation into the circumstances surrounding the loss of two fuel rods. The NRC team will arrive at the

Millstone plant, in Waterford, Conn., on Tuesday. The four-member team will spend about two weeks on site and also will evaluate the company's root cause analysis." The press release indicates that an inspection report will be submitted within 30 days of the completion of the inspection. Please provide me with a copy of this report.

- 12) In your February 1, 2001 letter you indicated that both the Richland, Washington and Barnwell, South Carolina facilities "could retrieve waste, if necessary, because of the existence of records for the location of specific disposals." You also indicated that "because the fuel rods remain highly radioactive longer than low-level radioactive waste, there is a potential for higher doses to possible intruders after the Part 61 controls [which rely on 100 years of active institutional controls, government land ownership, and engineered barriers] are no longer in effect."
- a) If you determine that the spent fuel rods may be located at the South Carolina or Washington sites, will you order retrieval of these materials? If so, how will this be done? If not, why not?
  - b) Why don't the records at Washington and South Carolina clearly indicate whether or not the fuel rods were disposed of there? Doesn't this indicate a more widespread problem with the record-keeping system? If so, what will you do to ensure that the problem is corrected? If not, why not?
  - c) If retrieval of the materials is not undertaken, will you extend the Part 61 controls beyond the 100-year period currently in the regulations in order to protect against exposure to possible intruders? If such controls are not extended, isn't there a potential threat to public health, safety and the environment?
  - d) You said in your letter that another potential hazard would be potential migration of radionuclides into the groundwater that would eventually expose members of the public to radiation. You also said that the severity of the hazard would depend on factors such as the specific radionuclides in the waste and site specific characteristics, such as how fast the groundwater moves. What is the nature of the hazard, based on the amounts of plutonium and uranium in the two spent fuel rods and the movement of groundwater at the South Carolina and Richland sites?
- 13) In your February 1, 2001 letter, you said that it is unlikely that the two spent fuel rods were stolen, because "The very high radiation level of the material makes theft difficult, dangerous, and very unlikely" and "amount and chemical form of the fissile material contained in the two spent fuel rods make it unlikely, in our judgement, that the rods could be used to assist in the manufacture of a weapon." The FARC report reached similar conclusions. However, the September 11<sup>th</sup> terror attacks have demonstrated that terrorists may be willing to commit suicide in order to cause harm to America, and may be willing to devote many years to the planning and execution of such an attack.



- a) In light of the events of September 11<sup>th</sup>, have you re-evaluated the possibility that the fuel rods may have been stolen or diverted?
- b) Isn't it possible that rather than trying to use the fissile material from these weapons for a nuclear explosive device or weapon, terrorists might want to use it for a crude radiological weapon, or "dirty bomb" aimed at dispersing radioactive materials in a populated area?
- c) What would be the worst-case public health, safety, and environmental consequences of detonation of a "dirty bomb" fabricated from the two Millstone spent fuel rods?

**Questions on the October 26 2001, U.S. DOE Inspector General Report on Accounting for Government-Owned Nuclear Materials Provided to Non-Department Domestic Facilities**

The October 26, 2001 report found that DOE inventories indicated that "significant quantities of Government-owned special nuclear material were held by at least two NRC licensees despite the fact that the facilities no longer existed." In the first instance, the special nuclear material involved was a significant quantity of plutonium that was reported to be stored at an NRC facility as of September 2000, even though the NRC did not believe it had held plutonium since 1996. In the second instance, DOE records indicated that a significant quantity of Government-owned plutonium was held at a plant whose license NRC terminated in 1993 and at which no materials were known to be stored. According to the report, NRC officials were unable to explain the discrepancies.

- 1) In each of these cases, what has the NRC done to resolve the discrepancy?
- 2) Has the NRC been able to account for the whereabouts of these materials and arrange for their proper disposal? Is NRC certain that the materials are in the possession of individuals who are authorized to possess them?
- 3) If the NRC has not yet located the materials, what steps will be taken to locate and properly dispose of them?
- 4) What actions has the NRC taken, and what actions will the NRC take in the future, to ensure that this does not happen again?

The report also documented an instance in which the NRC retrieved a plutonium/beryllium source from an unsecured area of a high school that was no longer licensed to hold the material. The material had been provided to the school in the 1960s but was unaware of its existence until NRC retrieved it in 1989. Apparently, sealed sources such as this used to be tracked and monitored via an ad-hoc system called the "Sealed Source Registry," the use of which was discontinued in 1984 at the direction of the NRC.

- 5) Why did the NRC direct the use of the Sealed Source Registry to be discontinued?
- 6) What steps is the NRC taking to ensure that tracking of such materials is resumed and that improperly stored materials are properly disposed of, especially in light of the events of September 11 and reports that terrorists are actively seeking radioactive materials for use in improvised radiological dispersion devices? If no steps are being taken, please fully justify.
- 7) A recommendation made in the report is that a "comprehensive confirmation of all balances of Government-owned nuclear materials held by domestic licensees" be conducted and that DOE and NRC jointly ensure that future periodic confirmations occur regularly. Does the NRC agree with this recommendation? Why or why not? Has the NRC allocated sufficient resources to ensure that this recommendation can be carried out quickly? Why or why not?
- 8) Another recommendation made in the report is that "enhanced procedures for the accounting of Government-owned materials" be jointly developed and implemented by DOE and the NRC. Does the NRC agree with this recommendation? Why or why not? Has the NRC allocated sufficient resources to ensure that this recommendation can be carried out quickly? Why or why not?
- 9) Does the NRC agree that a similar system should be created to track non-Government-owned materials? Why or why not? Does the NRC agree with this recommendation? Why or why not? Has the NRC allocated sufficient resources to ensure that this recommendation can be carried out quickly? Why or why not?

#### **Questions Regarding Risk of Terrorist Attacks Involving Radioactive Sources**

I have been informed that approximately 2 million radioactive sources may have been distributed in the United States (excluding very low level sources such as those used in some smoke detectors). These sources are used in a wide array of applications, including medicine, research, and various industrial processes or other commercial uses. While some estimate that about 500,000 of these are no longer needed, they have not been disposed of, and each year the NRC is said to receive approximately 375 reports of lost, stolen or abandoned radioactive sources – a figure that may understate the actual numbers since many lost or stolen items may never be reported. While the radioisotopes used for such applications may not be usable to produce a nuclear explosive device, there is a potential for them to be used to fashion a crude radiological device or

"dirty bomb." I am concerned that such a device could be used to contaminate critical infrastructure, disrupt our nation's financial markets or impede normal economic activity, or paralyze government functions.

- 1) How many radioactive sources (excluding smoke detectors) are currently licensed by the Commission in the United States? Please provide a breakdown of the types of sources and categories of users of such sources (e.g., research, medical, industrial, commercial, etc.).
- 2) The NRC's web site reports on several instances of companies being fined for failures to properly control radioactive sources since August of this year, including sources containing americium-241, cesium-137, and iridium-192. According to the press releases on the web site, these sources were either lost, stolen, or improperly disposed of. I have been informed that each year, the NRC receives approximately 375 reports of lost, stolen, or abandoned radioactive sources. Is this true?
- 3) For the past five years, please indicate a) how many reports of lost, stolen or abandoned radioactive sources NRC received, b) in how many of those cases were the materials recovered, c) the total amount of each radioisotope that has been reported missing and not yet recovered, along with the half-life of each radioisotope, and d) in how many of the reported cases was the responsible party fined, listing the responsible party and the amount of the fine for each such case.
- 4) A security expert recently suggested to me that a radioactive source as small as 1 curie could be effectively used as a terrorist weapon. Is this true? What would be the worst-case public health, safety and environmental consequences if a terrorist acquired a 1-curie source and detonated it in a crude "dirty bomb" in a populated area? What if the terrorist milled the source into fine particles (e.g., 1-micron average diameter) and detonated it in a populated area?
- 5) In the aftermath of the September 11<sup>th</sup> attacks, is the Commission at all concerned about the potential for radiological sources to be used as a weapon by a terrorist organization? If not, why not?
- 6) Is the Commission satisfied that existing measures are adequate to protect and secure radioactive sources from theft or diversion? If not, please explain what specific measures the Commission is considering to better protect and secure radioactive sources from theft or diversion. If so, why is it that so many sources cannot be accounted for?
- 7) What measures exist to assure that radioactive sources that are no longer needed are properly disposed of?
- 8) Many industrial processes (such as fluid level sensing and others) utilize radioactive sources. In the past, using radioactive sources may have been the most technologically advanced and/or economic means of accomplishing the task in question. However, advances in optics and other technologies may provide other, equally cost-effective options. Given the numerous reports of missing radioactive materials, as well as the danger these materials

The Honorable Richard A. Meserve  
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pose, what does the NRC do to ensure that those seeking licenses to use radioactive materials for industrial processes actually need them and have no other cost-effective alternatives? If no actions are currently being taken to ensure that these materials are not needlessly disseminated, why not?

Thank you for your assistance and cooperation in responding to this request. Should you have any questions about this inquiry, please have your staff contact Mr. Jeffrey S. Duncan or Dr. Michal I. Freedhoff of my staff at 202-225-2836.

Sincerely,

A handwritten signature in dark ink, appearing to read "Ed Markey", with a large, stylized loop at the end.

Edward J. Markey  
Member of Congress